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NATIONAL DAM SAFETY PROGRAM. CRESCENT DAM (INVENTORY NUMBER NY --ETC(U)
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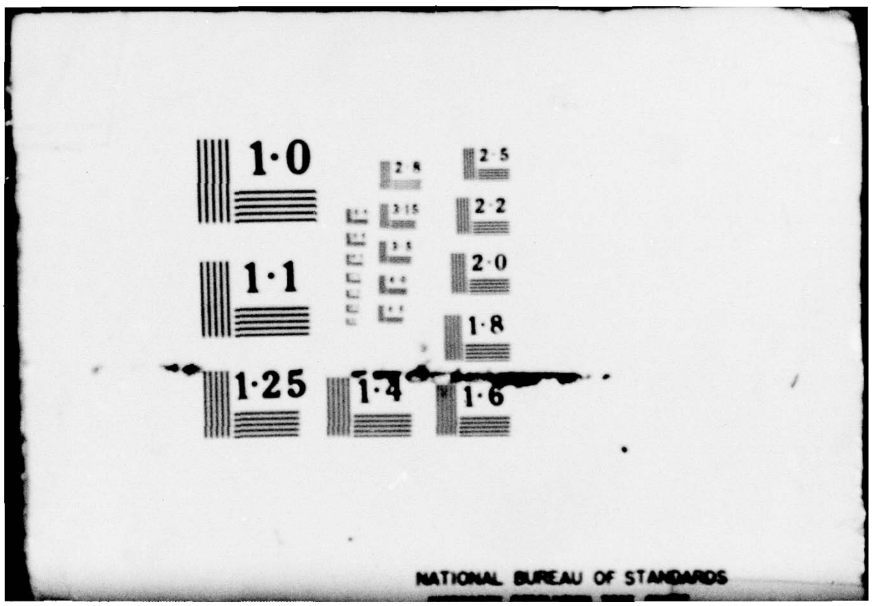
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MOHAWK RIVER BASIN

CRESCENT DAM

SARATOGA COUNTY
NEW YORK

INVENTORY № NY 171

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

SEPTEMBER 1979

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Crescent Dam
Saratoga County
Troy

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam. (over)

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Additional hydrologic investigations are required to more accurately determine the site specific characteristics of the watershed. Computations prepared according to the Corps of Engineers' screening criteria establish the spillway capacity at 160,000 cfs. This capacity is 28% of the Probable Maximum Flood and 56% of the 1/2 Probable Maximum Flood. The PMF and 1/2 PMF are 571,000 cfs and 285,000 cfs respectively. The spillway is inadequate to pass the 1/2 PMF without overtopping the dam. The westerly section, Dam B, is unstable under all of the loading conditions prescribed by the Corps of Engineers' screening criteria. Therefore, the spillway structure is determined to be seriously inadequate according to the Corps of Engineers' screening criteria.

Although a dam break analysis was not performed on this run-of-river structure, the dam break flood wave is adjudged to have a significant impact on the residential structures 1/2 mile downstream. The spillway is, therefore, seriously inadequate and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

Additional structural investigations involving borings should be undertaken to determine the affect of uplift pressure on the base of the dam and provide further analysis of the structural stability of the dam. It shall evaluate the reduction of the concrete section due to erosion and the affect of this reduction on the stability of the dam.

It is, therefore recommended that within 3 months of the date of notification of the Owner, the above-mentioned structural stability investigations of the structure should be initiated to determine the appropriate mitigating measures to be taken. Within 2 years of the date of notification, appropriate remedial measures should be completed. In the interim, a detailed emergency operation plan and warning system should be developed and around-the-clock surveillance should be provided during periods of unusually heavy precipitation.

The visual inspection and screening analysis revealed additional deficiencies which require the following remedial measures:

1. Complete the aforementioned structural investigation. Perform remedial measures based on the structural stability investigation.

2. Repair the deteriorated concrete at the abutment walls, the spillway construction and expansion joints.

3. Paint and repair the tainter gates and tainter ga[illegible]ture. Repair the gates and/or concrete to eliminate leakage [illegible]nd the tainter gate while in the closed position.

These items should also be investigated and needed remedial work completed within 2 years of notification.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

TABLE OF CONTENTS

FIGURES

APPENDIX

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Crescent Dam, NY171

State Located New York
County Located Saratoga and Albany
Stream Mohawk River
Date of Inspection August 1, 23, 1979

ASSESSMENT OF GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

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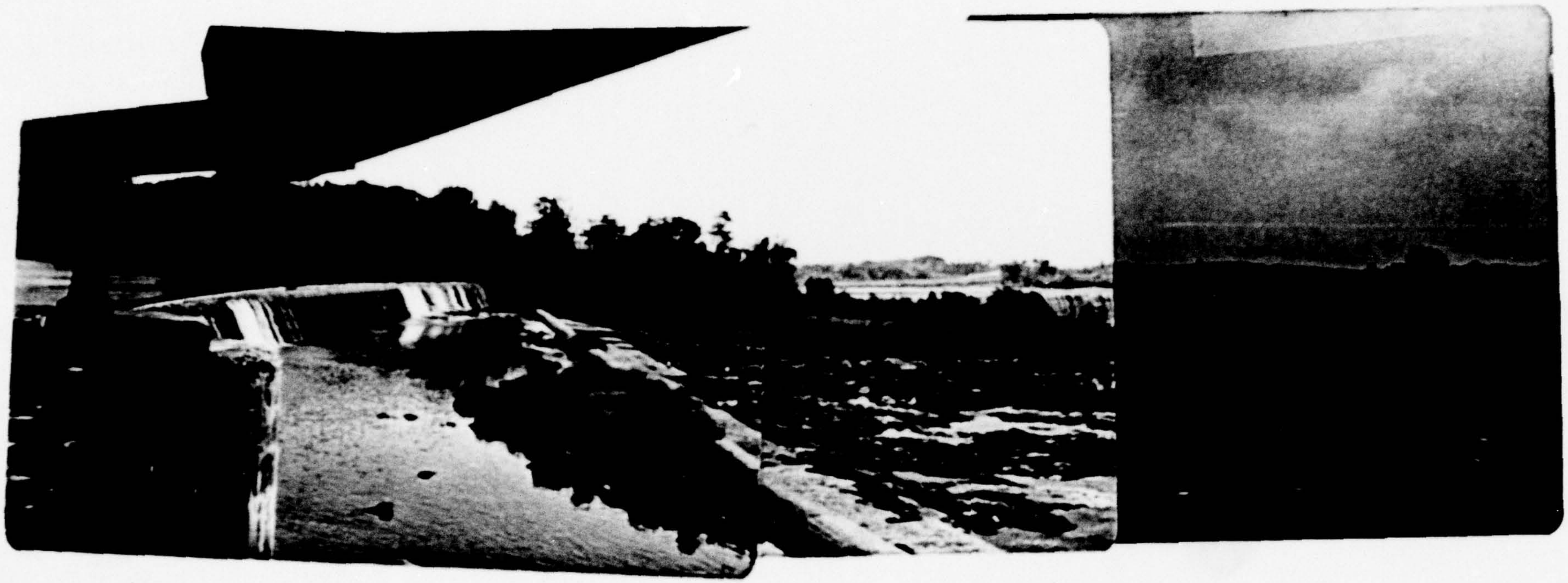
Dale Engineering Company

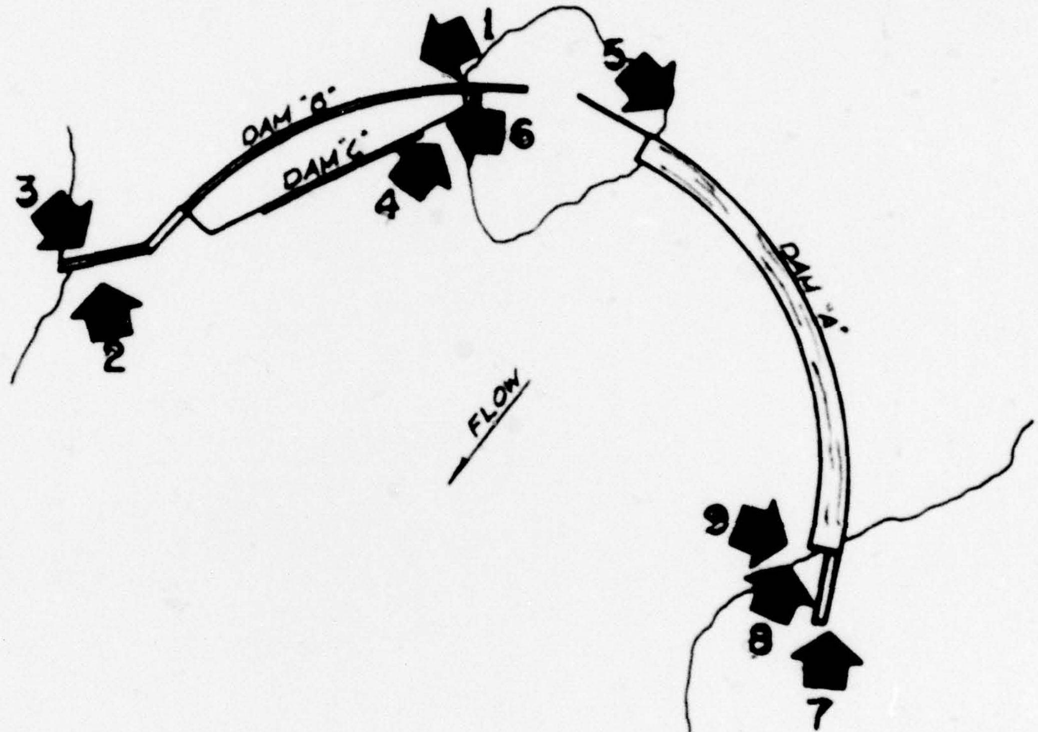
John B. Stetson, President

Approved By:
Date:

Col. Clark H. Benn
New York District Engineer
28 Sept 79



Overview of Crescent Dam from western end of dam and tainter gate structure. Dam composed out two overflow sections divided by island in middle of Mohawk River. The west dam section has older dam structure immediately below it.



PHOTOGRAPHIC KEY MAP

STETSON • DALE	DATE 8·30·79	DRAWN JPG	CRESCENT DAM
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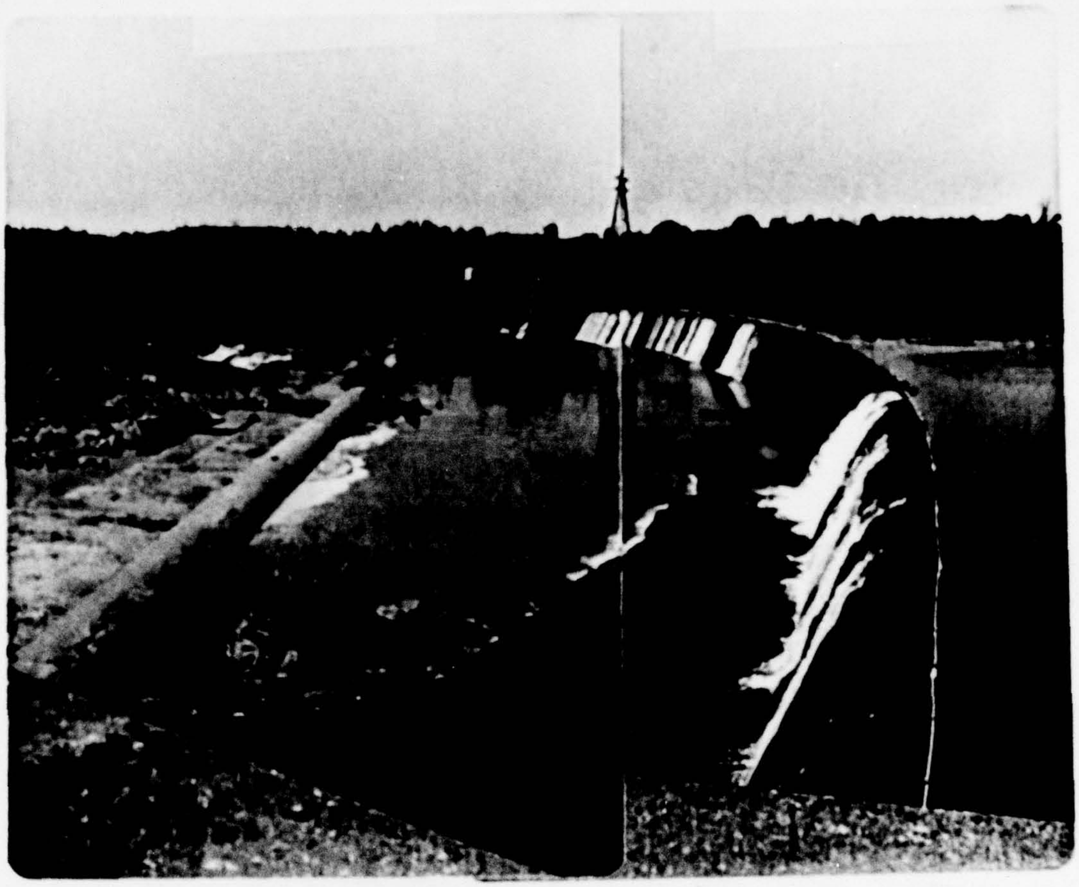
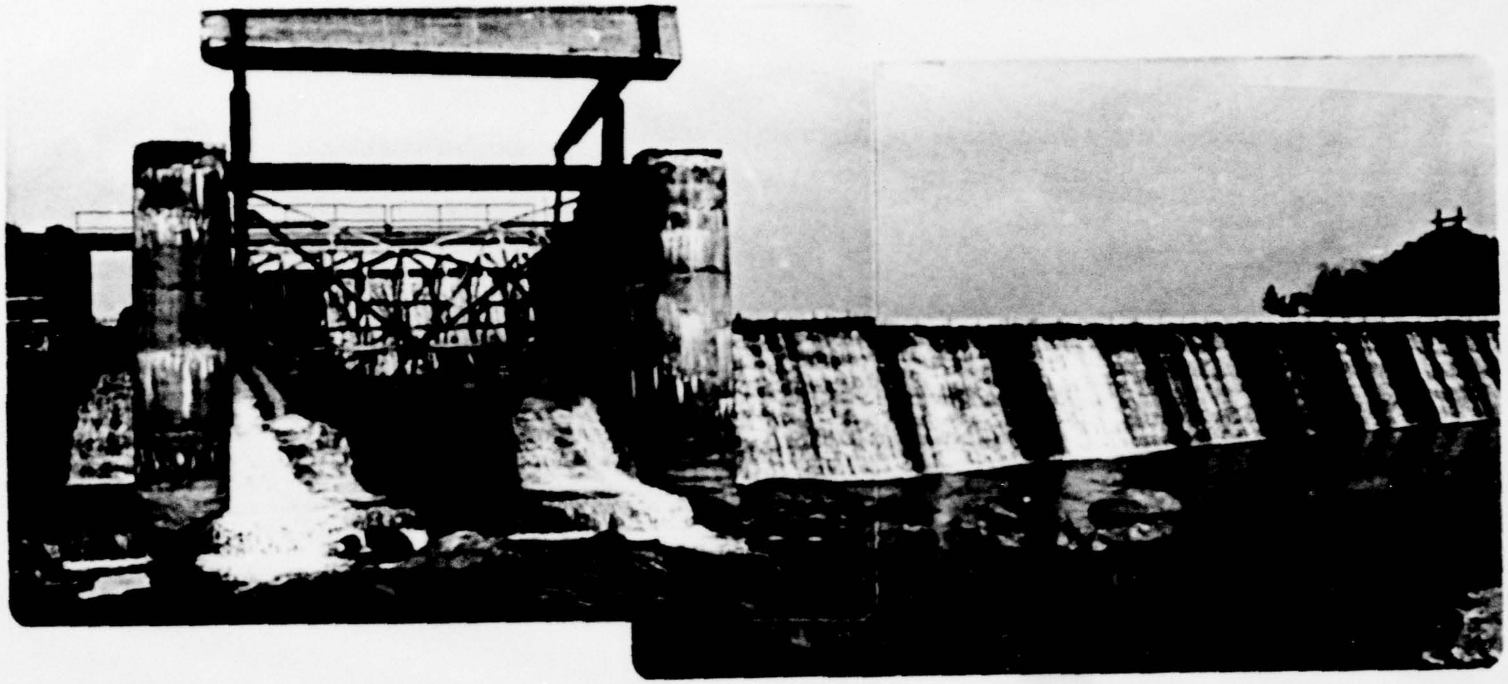


1. View of west dam section looking towards west shore. Flow over dam is coming under flashboards. Notice severe spillway surface erosion. Flow at point 1/4 across dam is coming under flashboards at section where crest surface has eroded. Immediately beyond this point, flow can be seen through monolith construction joint.



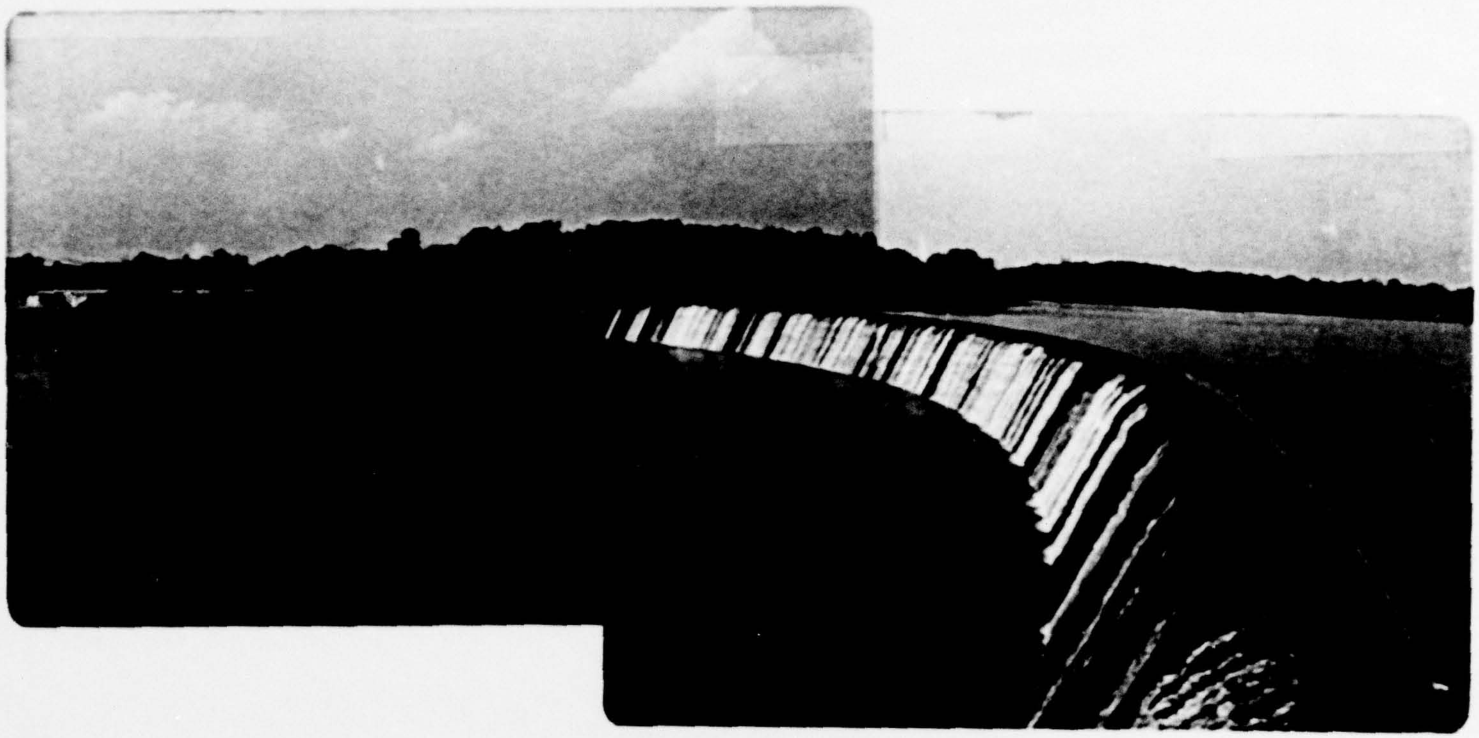
2. Close-up of west dam's west abutment on extreme left, water passage, tainter gate, and spillway with flash-boards. Notice significant leakage around sides of gate and the severely eroded spillway surface with 12 inches of erosion along the top most construction joint.

3. Close-up of tainter gate steel work showing corrosion of steel members and plate.

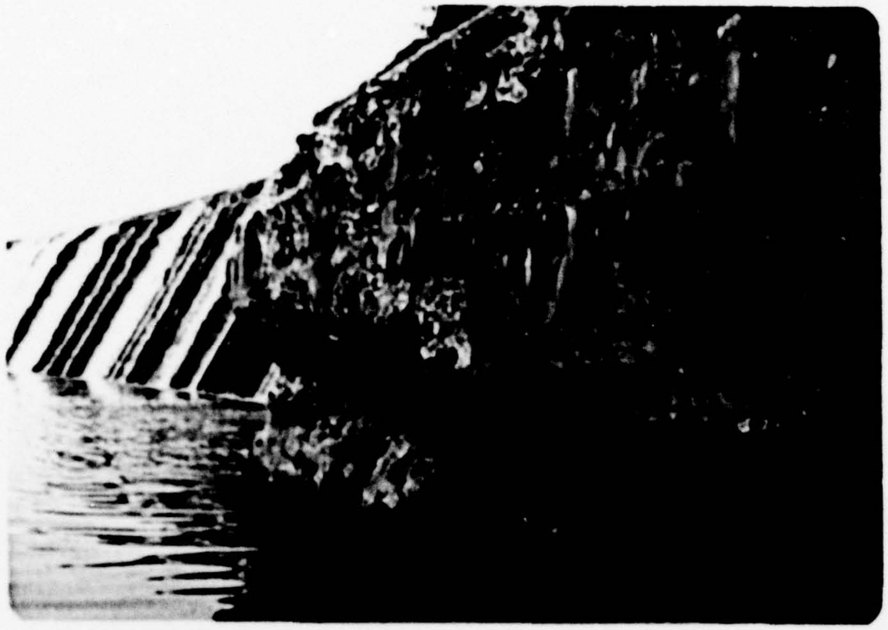
4. Close-up of west dam's east abutment.

5. View of east dam looking towards east abutment. Pool of the School Street Dam, one mile downstream, comes up to base of spillway.

6. Close-up of spillway surface of east dam section taken from east abutment. Note steel bars exposed in foreground and extent of surface erosion in center portion of picture.



7. View from east abutment of north dam section looking towards island in the center of the river.



8. Close-up of wall below spillway of east dam showing deterioration at waterline.

9. Close-up of deterioration at end of wall and erosion behind walls. The rock surface is very moist.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - CRESCENT DAM ID# - NY 171

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and The New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Crescent Dam and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Crescent Dam is a concrete gravity spillway structure which is composed of two main sections which meet at an island in the Mohawk River. An electric power generating station is located on the west bank of the Mohawk River. The forebay to the generating station consists of 10 sluice gate openings which are constructed to accept stop planks. The easterly end of the forebay structure terminates in a small island. Just east of the small island is located a small stop plank structure and a tainter gate. The tainter gate forms the west abutment of one of the main sections of the dam structure. The maximum height of this section of the dam is approximately 20 feet. The stop log structure is 8 feet wide and the tainter gate is 30 feet wide. The east abutment of the westerly section of the dam is

located on a small island in the center of the Mohawk River. The easterly bank of this small island forms the westerly abutment of the easterly section of the dam which stretches across the major river channel to the east bank of the Mohawk River. The easterly section of the dam reaches a maximum height of approximately 36 feet. The Barge Canal enters the Mohawk River channel just upstream from the easterly abutment of Crescent Dam. The combination of power generating station, control structures, the two sections of the dam span the entire width of the Mohawk River in this area. This dam is the first in a series of dams that are used to regulate flow within the Mohawk River for navigational purposes and for use in power generation.

b. Location

The Crescent Dam is located in the Town of Waterford, Saratoga County and in the Town of Colonie, Albany County.

c. Size Classification

The maximum height of the dam is approximately 45 feet. The storage volume in the impoundment is somewhat less than 50,000 acre feet. Therefore, the dam is in the Intermediate Size Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Crescent Dam is located just upstream from the Cities of Cohoes and Troy. Therefore, the dam is in the High Hazard Category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

Waterway Maintenance Subdivision:	Region One:
New York State - DOT Main Office - State Campus 1220 Washington Avenue Albany, New York 12232 Director - Mr. Joseph Stellato (518) 457-4420	New York State - DOT Region 1 Office 84 Holland Avenue Albany, New York 12208 Engineer - Mr. John Hulchanski

The dam is owned by the New York State Department of Transportation.

f. Purpose of the Dam

The dam is used to regulate flows in the Mohawk River for navigational use and power generation. The Mohawk River is also used for recreational purposes.

g. Design and Construction History

Limited data was available regarding the design and construction history. Plans for the construction of the dam and lock are dated 1907. Records indicate the dam was completed in 1912.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation in cooperation with Niagara Mohawk Power Corporation who operates the power generating station under a lease agreement with the Department of Transportation. The main function of the facility is to provide adequate pool elevations for navigation in the Barge Canal system. The secondary function of the facility is for power generation at the power generating station. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Crescent Dam is 3455 square miles.

b. Discharge at Dam Site

No discharge records are available for this site.

Computed discharges:

Ungated spillway, top of dam	160,000 cfs
Ungated spillway, design flood	100,000 cfs est. from plans
Gated drawdown, tainter gate capacity	Not calculated
through hydropower facility	4,343 cfs at normal pool

c. Elevation (Elevations are in Barge Canal Datum. Barge Canal = USGS + 0.99 ft.)

Top of dam	193.0
Maximum pool - Design discharge	191.0 est. from plans
Spillway crest	184.0
Stream bed at centerline of dam	148.0±

d. Reservoir

Length of maximum pool	53,500 ft (1/2 PMF)
Length of normal pool	53,500 ft

e. Storage

Top of dam	67,900 acre feet
Normal pool	49,900 acre feet

f. Reservoir Area

Spillway pool	1996.3± acre

g. Dam

Type - Concrete, gravity.
Length - 2001± feet
Height - 45 feet
Freeboard between normal reservoir and top of dam - 9 feet
Top width - Spillway - 11.5 ft., Abutment - 18 ft.
Side slopes - Downstream - 2 vertical/1 horizontal, Upstream - vertical
Zoning - N/A
Impervious core - N/A
Grout curtain - N/A

h. Spillway

Type - Ogee crest
Length - 1436.2 ft.
Crest elevation - 184.0
Gates - Ungated
U/S channel - Natural
D/S channel - 1 ft. to elevation 185.0

i. Regulating Outlets

Tainter gate - 30 ft. wide, 16 ft. high
Stop plank structure - 8 ft. wide, 10 ft. high

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for the evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 through 11. Limited hydrologic information regarding the design of this dam was available. This is included in the text of Section 5.5, page 11. The drawings show cross-sections and dimensions of the various structural elements of the dam but do not include information on the properties of the foundation material nor stability analysis.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 11 in this report. The last available dam inspection report by the State of New York Conservation Commission is dated June 12, 1916.

2.3 OPERATION

No Operating Manual is known to exist for this structure.

2.4 EVALUATION

The plans for the construction of the facility agree with the visual observations made in the field. The information included in this report is adequate to complete this Phase I investigation. Therefore, no additional research for data is required in order to complete this Phase I investigation.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Crescent Dam was inspected on August 1, 1979 and on August 23, 1979. The Dale Engineering Company Inspection Team was accompanied on the first inspection by Walter Elliot of the New York State Department of Transportation. On the second inspection, the inspection team was accompanied by Robert McCarty of the New York State Department of Environmental Conservation Dam Safety Section.

b. Dam

At the time of the inspection, the water level on the upstream side of the dam was below the top of the flashboards, however, leakage between the flashboards and the crest of the dam was of such a volume as to partially obscure the concrete surfaces of the spillway. The southerly section of the Crescent Dam is rather severely deteriorated at both horizontal joints along the spillway surface and at the vertical joints between monoliths. The center portion of the dam appears to be less severely deteriorated than the areas near the abutments. The north section of the dam is also deteriorated along horizontal joints, although this deterioration is at somewhat of a lesser degree than the south section. No through-the-dam seepage was detected during the inspection because of the water flowing over the face of the dam. There is some deterioration of the concrete walls at each abutment. The most severe deterioration was found at the north abutment of the North Crescent. The concrete at this north abutment was deteriorated to a depth 1-1/2 to 2 feet in the area at the lower pool elevation. Some erosion behind this abutment wall has also occurred.

c. Appurtenant Structures

The forebay of the generating station on the south bank of the river is controlled by a stop plank structure. At the time of the inspection, there were no stop planks on the site and the Department of Transportation representative indicates that stop planks have never been used to dewater this forebay to the best of his knowledge.

d. Control Outlet

The tainter gate which controls discharge from the impoundment is electrically operated. The gate structure is definitely in need of maintenance, although no significant deterioration of the steel was noted. Leakage occurs around the sides of the gates. The stop plank structure also controls the outlet from the impoundment. The stop plank structure was in operating condition and some of the stop

planks were in place at the time of the inspection. The concrete surfaces around the tainter gate and the stop plank have been recently repaired, although significant deterioration in the tainter gate wall at the downstream water elevation is still evident.

e. Reservoir Area

The reservoir consists of approximately 10 miles of river channel which extends upstream to the Vischer Ferry Dam. There are no known areas of bank instability along this course.

f. Downstream Channel

The downstream channel is formed in bedrock.

3.2 EVALUATION

The visual inspection revealed generally deteriorated concrete surfaces on the spillway structure and at the spillway abutments near the downstream waterline. No major deformation of the alignment of any of the structures was noted in the visual inspection. The tainter gates and stop log structure are in operating condition, although maintenance is required on the tainter gate. The gates controlling flow into the forebay of the power generating station are not in operating condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary function of this facility is to control water levels in the impoundment upstream from the dam for navigational purposes in the Barge Canal. Operation procedures are directed toward this end. The tainter gate at the Crescent Dam is operated to control this water level. Flows through the power generating station are also controlled to assure that water levels in the impoundment are adequate for navigational purposes. The operation of the facility is under the control of the New York State Department of Transportation.

When water is 2.0 feet above masonry dam and the flashboards are on the dam, the tainter gate is open 9.0 feet, provided no ice is in the river. When the water recedes to 1.0 feet above masonry dam, the tainter gate is closed.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. The Department inspects the facility every two years and a report on the condition of the structure is filed at the Central Office in Albany. Maintenance of the structure is scheduled on a priority basis as a result of the bi-annual inspections.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the flow into the downstream channel are under the control of the New York State Department of Transportation. These gates are operational at the present time.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the New York State Department of Transportation. Maintenance on the structure has been minimal in recent years as evidence by the deteriorated conditions of the concrete on the spillway and of the steel tainter gate. These conditions indicate that, in the past, maintenance has not been adequate.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Mohawk River Basin drains 3456 square miles above Cohoes, New York, according to the USGS stream gage which is located nearby the dam. The river flows south from its source in west-central New York until it reaches the City of Rome, from which it proceeds in a east-southeast direction to Cohoes where it joins the Hudson River. For most of its 156 miles, the Mohawk River is paralleled by the State Barge Canal. Two of the basin's three major reservoirs are used to supplement the flow in the canal. They are Delta Reservoir, on the Mohawk River itself; Hinkley Reservoir, on West Canada Creek; the third impoundment, Schoharie Reservoir, is located on Schoharie Creek in the southern most part of the study area used to supplement the water supply of the City of New York.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run-of-river facility and the downstream dam break flood wave analysis is multi-dimensional. The initial hazard area is one-half mile below the dam.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Intermediate Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing the Probable Maximum Flood.

An HEC-1 computer model for the basin was published by the New York District Corps of Engineers in a report entitled Hydrologic Flood Routing Models, Upper Hudson and Mohawk Rivers, dated October, 1976.

The report was reviewed for the purpose of this investigation and the model which was used for preparation of the report was obtained from the New York District. The model was recoded and executed for analysis of the PMF. No changes were made to the unit hydrograph, base flow, loss rate or routing parameters.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.9 inches according to Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used were those applied in the Transferred Agnes Storm and SPF Analysis in the modeling report. One multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed. Rainfall was distributed evenly over the basin.

5.3 SPILLWAY CAPACITY

The spillway system is composed of two crest shaped spillway sections. Dam A is 900 feet in length and Dam B is 506 feet in length, with an estimated design head of 7 feet for both dams. Discharge coefficients were computed between 3.3 and 4.15. Submergence was not checked. The pool of the School Street power dam, less than a mile downstream, comes up to the toe of Dam A but not Dam B which is less in height.

At the top of dam elevation, the overflow spillway capacity was computed at 160,000 cfs. Two sources of information were used to assess flood magnitudes on the Mohawk in the vicinity of the dam. The aforementioned computer model and the USGS gage at Cohoes, New York. The PMF and 1/2 PMF values computed from the computer model were 571,000 cfs and 285,000 cfs respectively. A frequency analysis of the gage at Cohoes which was obtained from the New York District of the Corps of Engineers indicates that the 500 year flood has a peak of 198,000 cfs. Plotting and extending the frequency analysis results suggests that the PMF and 1/2 PMF may be 300,000 cfs and 225,000 cfs. No adjustment in the gage results for the drainage area was made to assess the flow conditions at Vischer Ferry, since the difference in the drainage area is not significant.

SPILLWAY CAPACITY

	HEC-1 DB Model		Frequency Analysis of Gage	
	Discharge	Capacity as % of Discharge	Discharge	Capacity as % of Discharge
PMF	571,000	28%	300,000	53%
1/2 PMF	285,000	56%	225,000	71%

5.4 RESERVOIR CAPACITY

The reservoir storage capacity at top of dam is estimated at approximately 49,900 acre feet.

5.5 FLOODS OF RECORD

Floods have been measured at USGS gaging station 01357500 at Cohoes, New York since 1918. No events have been recorded which are greater than the top of dam spillway capacity. Four floods have occurred equal or greater in magnitude than the high water elevation of 191 feet shown on Contract No. 14 Plans. That elevation equates to a design flood capacity of 100,000 cfs.

1964	143,000 cfs
1936	130,000 cfs
1938	102,000 cfs
1956	100,000 cfs

The Department of Transportation, Mohawk River Canal design computations show a design flood of 95,000 cfs, these computations were dated October 3, 1913. They also show top of dam capacity at 154,000 and design flood elevation discharge 105,000 cfs.

Flood waters were observed over the Crescent powerhouse forebay walls in March, 1968. That flood elevation corresponds to 7 feet over the crest of the dam.

5.6 OVERTOPPING ANALYSIS

Overtopping of the dam would occur as follows:

	OVERTOPPING IN FEET	
	HEC-DB Model	Frequency Analysis
PMF	10.5	4.5
1/2 PMF	4.0	2.0

According to this analysis, the dam would be overtopped by the 1/2 PMF using either procedure to developing the hydrologic and hydraulic information.

5.7 EVALUATION

The spillway is inadequate to pass the 1/2 Probable Maximum Flood without overtopping the dam. Based on the Corps of Engineers' criteria, the dam is considered to have a seriously inadequate spillway since the stability computations performed in Section 6 have indicated that a portion of the dam, Dam Section B, is unstable under the 1/2 PMF event. The hydrologic analysis performed in this report indicates that the dam would be overtopped by a flood event with a return interval probability of once in every 300 years.

The river's downstream channel capacity as determined by the initial investigations suggests that at the 1/2 PMF condition, the downstream hazard, located 1/2 mile below the dam along the north shore, would

be at or near the threshold of flooding without a dam break condition.

An accurate dam break computer analysis on a run-of-river type dam such as this is beyond the scope limitations of this study. However, it is anticipated that a break in the dam such as one or more of the monoliths failing would increase the flood stage to cause a significant increase in flooding conditions downstream.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Crescent Dam consists of two separate dam structures extending across the Mohawk River. The dam is sited at a location where an island exists near mid-river. By utilizing the island as a natural barrier to flow, the actual dam facility at this location could consist of two independent structures abutting to the island. At the dam location, the river extends in an approximately north-south direction. The structure damming the river to the westerly side of the island has an approximately east-west alignment (Dam B), whereas the structure on the easterly side of the island (Dam A) has been sited with more of a north-south orientation.

Both dam sections are concrete structures having a curved alignment. Virtually the entire lengths of both dams function as spillway sections. The facility was inspected under conditions where limited spillway flow was occurring but visible/accessible downstream toe and abutment locations indicate the dam is sited on rock. Observations indicate the dam/spillway sections retain stability with no indication of structural displacement. With the spillways being topped, the physical condition of concrete in the structures was not fully visible for detailed evaluation. However, it was evident that surface deterioration of the concrete of the downstream faces has occurred: the more significant deterioration consists of spalling and erosion at the numerous construction joints in these poured concrete structures but a general spalling and erosion of the entire facing has also occurred, albeit less severe than at joint locations. Because of the spillway overflow condition, it could not be determined if through-the-dam seepage occurs.

The westerly abutment for Dam B consists of a single tainter gate structure joining a small reservoir bypass. Some, generally limited, deterioration of the concrete in this structure has occurred. The southerly/easterly abutment structure for Dam A consists of concrete which has experienced some deterioration, the most significant being an erosive undermining on the order of two feet deep of the downstream section of abutment headwall at tail water level. Some seepage at the rock face constituting the downstream exposure of this rock abutment occurs, but it is believed the flow represents gravitational ground water and not reservoir leakage (because of the near-vertical bedding planes of the rock which are parallel to the dam's longitudinal axis, reservoir leakage would have to be across the rock bedding, a very restrictive path for flow). Some erosion of soil materials has occurred in embankment areas immediately downstream of the dam but the condition does not present a danger to the dam structures at this time.

b. Geology and Seismic Stability

Crescent Dam is located within the Hudson Valley lowland which is a section of the Valley and Ridge Province. Both the dam and spillway are sited on bedrock of the Austin Glen Formation of Late Ordovician age. The formation here consists mainly of grayish, fine-to medium-grained, calcareous graywacke sandstone with some interbeds of black, fissile shale.

Structurally, the site is within a klippe, an erosional remnant of an overthurst block. Bedding is distorted with the strike variable, from nearly normal to parallel to the dam's orientation. At the westerly end of Dam B, beds strike N65E with a dip of 80° or more to the south. The joint system has two prominent sets with a spacing of two feet or less; both sets have a high angle dip of more than 80°, one set strikes N20W and the other N60W. At the easterly end of this dam, near the island, beds strike N85E and dip 65° south. Beds here are highly contorted. A small syncline is present downstream of the dam near the island, with a plunge to the southeast. Strikes vary from N10E to N30E and dips from 20° to 80°. At the southern end of Dam A the rock is mainly contorted shale, generally striking N25E, approximately parallel to the dam and at a high angle to the abutment; dip varies form 75° south to 90°.

At the abutment of the south easterly end of Dam A there is a ground water seep. Considering the orientation of the bedding relative to the dam and the relative impermeability of the shale perpendicular to the strike, the seep is most likely from ground water rather than dam or abutment leakage. However, the mined condition of the shale behind the abutment could be conducive to frost wedging.

Although faults are present in the region, there are no known faults or shear zones in the immediate vicinity of the dam site (See Geologic Map 1). The thrust block or klippe upon which the dam site is located would not be considered as being potentially active, being that it had been thrust into its present position from the east. The area is located within Zone 2 of the Seismic Probability Map but does have potential of a Zone 3.

Information on some of the larger earthquakes occurring in the area is tabulated below:

Date	Intensity - Modified Mercalli	Location Relative to Dam
1845	VI	21 mi S
1907	IV	14 mi W
1916	IV-V	15 mi NW
1916	V	34 mi N
1931	VII	41 mi N
1955	V	12 mi N
1958	IV	12 mi SW

A number of earthquakes of lesser intensity are known to have occurred in this region, according to the records of the New York State Geological Survey. Two of these were located about 9 miles west of the dam site.

c. Stability Evaluation

Design drawings available for review show plan alignment and cross-sections from the dam spillway but do not include information on the properties of the dam and foundation materials, nor stability analysis. As part of the present study, stability evaluation have been performed for dam spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations, but lacking assumptions felt to be practical were made. The stability computations assumed a structural cross-section based on dimensions indicated by the plans included in this report. It should be considered that in areas where deterioration has occurred, section dimensions would be less than indicated by the plans, with some adverse affect on the structural strength expected. The analysis also assumed dam sections to be monoliths possessing necessary internal resistance to shear and bending occurring as a result of loading.

The results of the stability computations are summarized in the table below. The stability analysis are presented in Appendix D. The analysis for Dam A is based on a complete dam section sited on foundation rock. Drawings available for Dam B indicate it to be embedded to a significant depth into the area's foundation material; the analysis for the dam is for the section above the ground line. Both dams have a curved alignment but stability benefits gained from possible arching effects have not been considered.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant Passing through Base***
	Dam A			
(I)	Water elevations at normal operating level, uplift on base plus 7.5 kips per lineal foot ice load acting.	1.45± (1)	5.1±	0.38b (1)
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions.	1.34± (2)	4±	0.33b (2)
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	1.31± (2)	3.8±	0.33b (2)
	Dam B			
(IV)	Water elevations at normal operating level, dam section analyzed is section above ground elevation, uplift on plane plus 7.5 kip per lineal foot ice load acting	1.17	7±	0.13b' (b' = width of dam on plane analyzed)
(V)	Water elevations at 1/2 PMF levels, uplift acting on plane as computed for normal operating conditions	1.1	4.8	0.08b'
(VI)	Water elevations at PMF levels, uplift acting on plase as computed for normal operating conditions	0.94	4	Not Applicable (outside b')

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

(1) Not considering affects of passive resistance at toe.
(2) Includes affects of some passive resistance at toe.

The analysis indicate Dam A is stable under forces possible during normal operations including ice, and the 1/2 PMF and PMF conditions, but the Dam B section analyzed is not stable under any of these conditions according to Corps of Engineers' evaluation criteria (e.g., where the resultant of forces acting on the dam is located outside of the middle third of the base or plane analyzed, tensile stress would develop in the dam section, a condition which is structurally undesirable because of the very low design tensile strength of concrete. The analysis indicate adequate structural stability would exist for Dam B if the concrete does possess limited tensile strength (See Appendix D).

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the dam's base/section and relative permeabilities of the site's foundation rock or dam concrete. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam section's upstream edge and a hydrostatic pressure based on the tail water elevation acting on the dam section's downstream edge. Uplift was assumed to vary linearly between a section's upstream and downstream faces, and act upon 100 percent of the dam base/section. The resulting uplift force represents a condition that is significant in arriving at the indicated factors of safety.

Uplift as computed for the normal operating condition was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period, because of expected low permeability through the foundation rock or dam concrete.

Further engineering studies are recommended for Dam B to fully evaluate this structure's as-built-condition and to plan measures necessary to improve the stability.

Though the computations indicate the Dam A is stable for the loading conditions studied, the analysis have been based on having a section which possesses structural integrity related to sound and undeteriorated construction materials. Field inspection observations indicate that concrete deterioration is occurring at numerous locations in the dam structure. For assurance of stability, maintenance/repair need be undertaken to rehabilitate the structural concrete comprising the spillway and abutment structures. The maintenance/repair program should include an inspection with the reservoir level slightly below spillway elevation to detect possible through-the-dam and under-dam seepage, and also an inspection with a lowered reservoir to evaluate the physical condition of the dam section's upstream face.

Maintenance inspections should extend to regularly scheduled observations of the areas downstream of dam sections where soil erosion and rock seepage has been noted, to detect significant changes which could effect the dam structures and require an action for their protection.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I inspection of the Crescent Dam on the Mohawk River did not indicate conditions which constitute an immediate hazard to human life or property. The tainter gate which controls flow from the impoundment is in need of maintenance. Although the concrete surfaces at this tainter gate have recently been repaired, the steel members of the gate structure are heavily rusted and substantial leakage occurs around the gate while in the closed position. Deterioration of the abutment wall has occurred at the level of the downstream pool. The hydrologic/hydraulic analysis indicates that the dam would be overtopped during a 1/2 PMF flood event. The stability analysis indicates that Dam B, (the westerly spillway section) is unstable under all loadings as prescribed by the Corps of Engineers' criteria, since the resultant of the forces acting on the dam is located outside the middle third of the plane analyzed. Therefore, according to the Corps of Engineers' criteria, the spillway is classified as seriously inadequate and the dam is assessed as unsafe, non-emergency. The visual inspection of the dam also disclosed substantial deterioration of the concrete spillway surfaces along both horizontal and vertical joints.

The following specific safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and structural ability:

1. Concrete surfaces of the spillway sections are significantly deteriorated along both horizontal and vertical joints.

2. Concrete at the base of the abutment walls is severely deteriorated at the water level of the downstream pool.

3. The tainter gate system is heavily rusted and leakage occurs around the gate while in the closed position.

b. Adequacy of Information

The information available is adequate for this Phase I inspection report. Design and construction information is limited to the construction plans.

c. Urgency

The deterioration of the concrete surfaces has resulted in a reduction in the dam section. This could further reduce the stability of the dam. Therefore, the structural investigations recommended below should be undertaken within three months and remedial work should be completed within two years.

d. Need for Additional Investigation

Additional structural investigations involving borings should be undertaken to determine the affect of uplift pressure on the base of the dam. It should evaluate the reduction of the concrete section due to erosion and the affect of this reduction on the stability of the dam. This investigation should address the stability of the dam.

7.2 RECOMMENDED MEASURES

The following steps should be undertaken:

1. Complete the aforementioned structural investigation. Perform remedial measures based on the structural stability investigation.

2. Repair the deteriorated concrete at the abutment walls, the spillway construction and expansion joints.

3. Increase the level of maintenance on the tainter gate structure and eliminate leakage around the tainter gate while in the closed position.

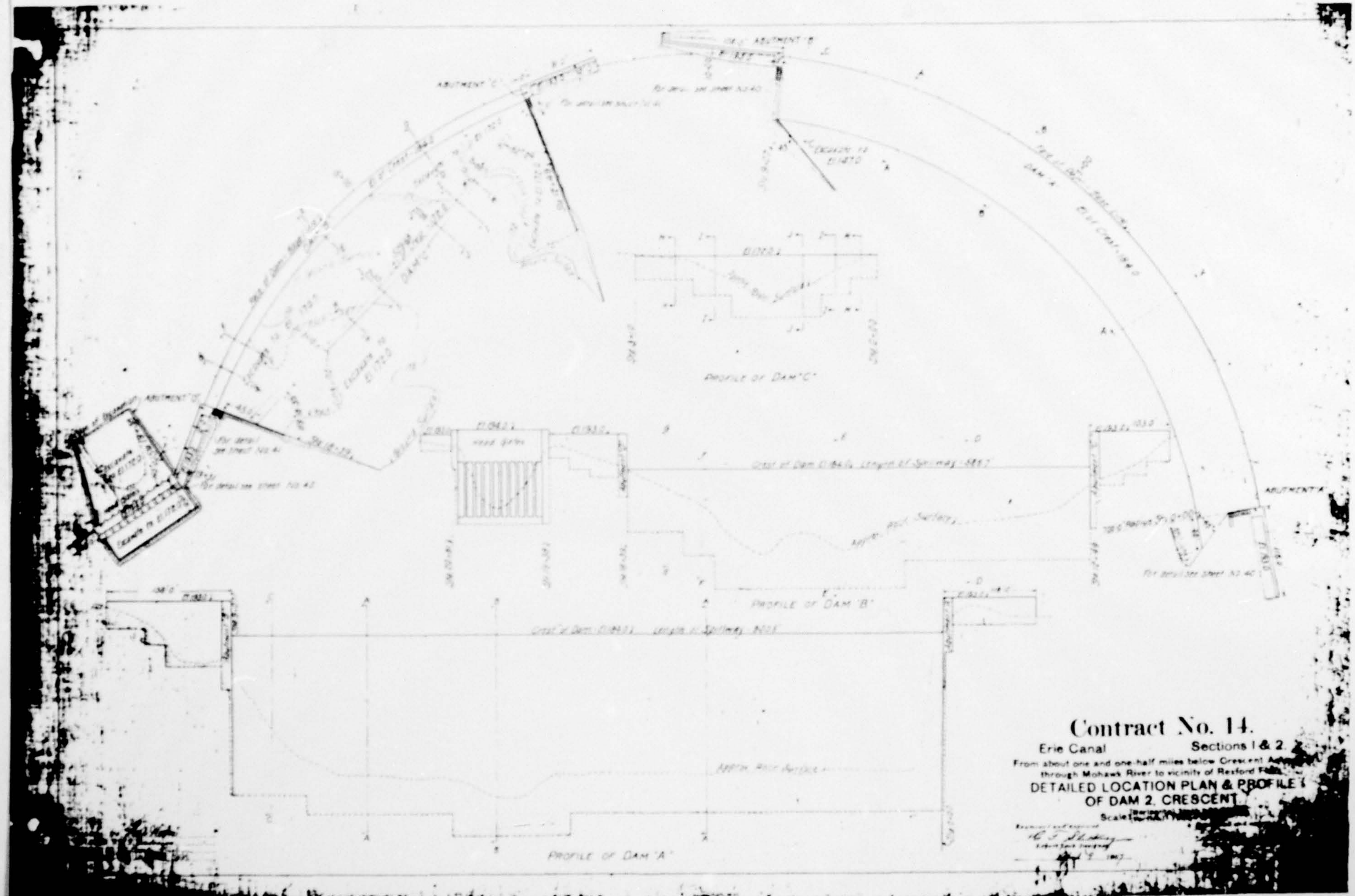
VICINITY MAP

LOCATION PLAN

FIGURE 1


Land to be appropriated
MOHAWK RIVER
Contract No. 14
Erie Canal
Section
PLAN OF DAM

FIGURE 2


ABUTMENT 'A'
ABUTMENT 'B'
ABUTMENT 'C'
ABUTMENT 'D'
PROFILE OF DAM 'C'
PROFILE OF DAM 'B'
PROFILE OF DAM 'A'
Head Gates
Contract No. 14.
Erie Canal
Sections 1 & 2.
From about one and one-half miles below Crescent
through Mohawk River to vicinity of Rexford
DETAILED LOCATION PLAN & PROFILE
OF DAM 2, CRESCENT
Scale

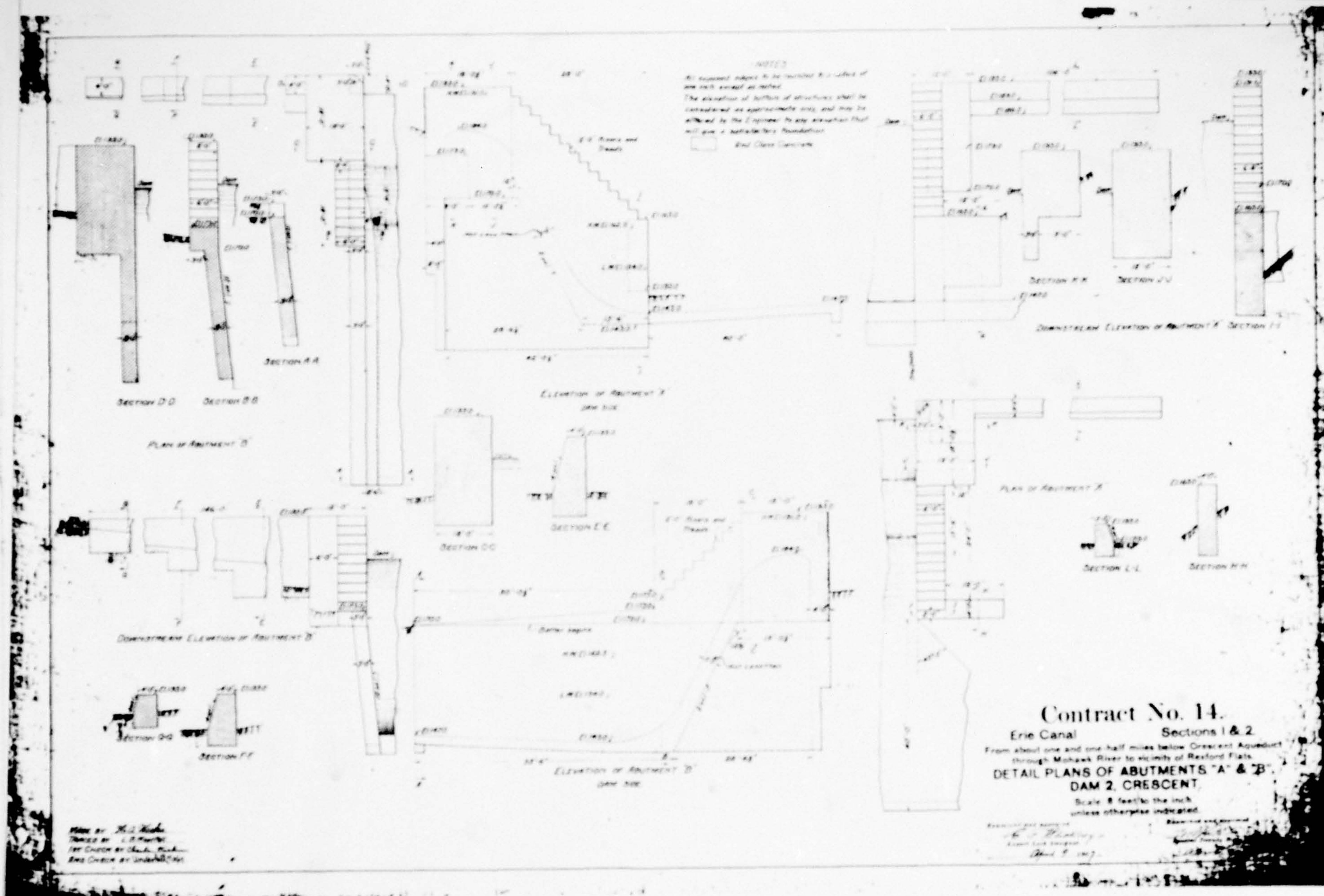
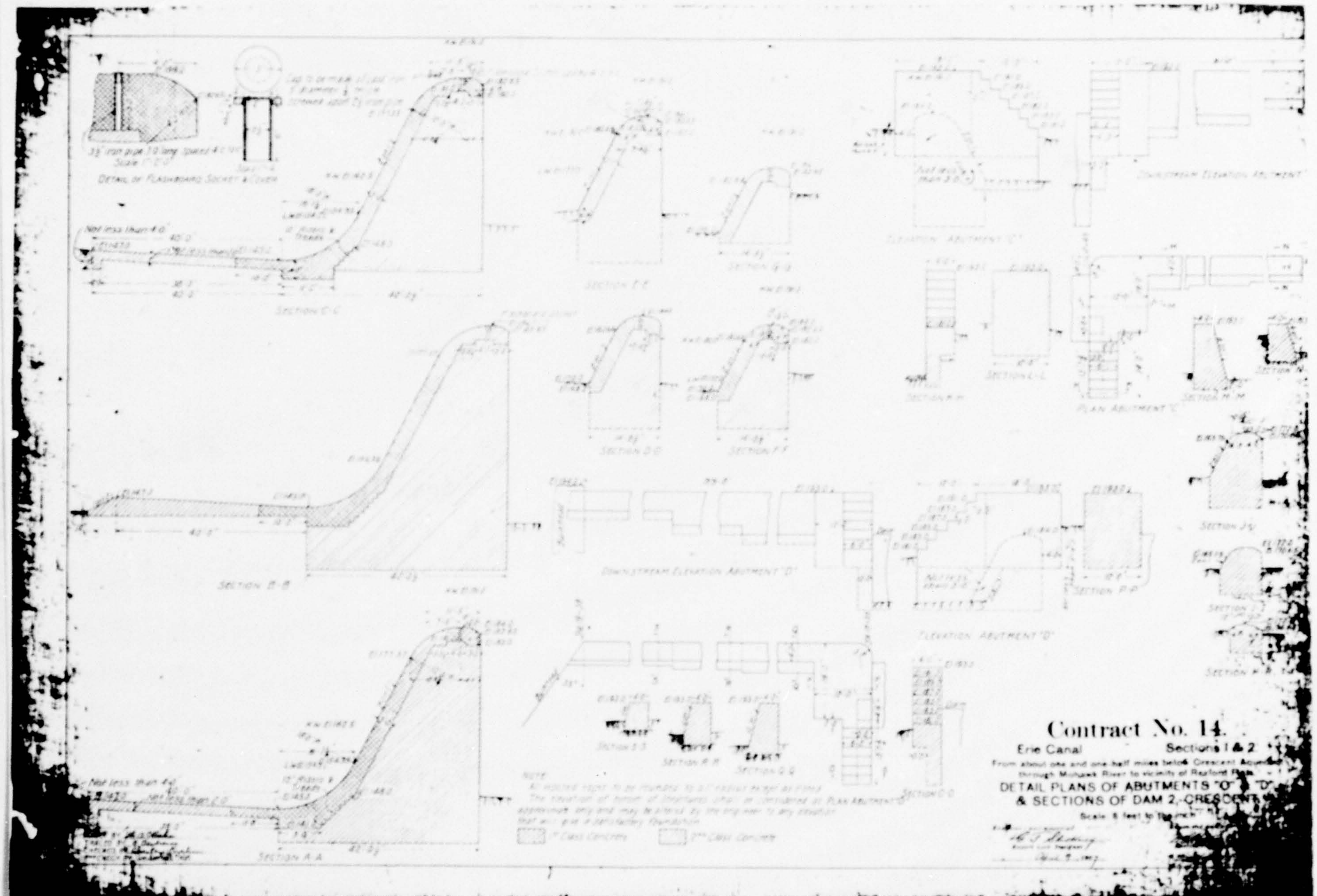

Contract No. 14.
Erie Canal
Sections 1 & 2
From about one and one-half miles below Crescent Aqueduct through Mohawk River to vicinity of Rexford Flats.
DETAIL PLANS OF ABUTMENTS "A" & "B".
DAM 2, CRESCENT.
Scale 8 feet to the inch unless otherwise indicated.
Section D-D
Section B-B
Section A-A
Plan of Abutment "B"
Elevation of Abutment "A" Dam Side
Section C-C
Section E-E
Downstream Elevation of Abutment "B"
Section G-G
Section F-F
Elevation of Abutment "B" Dam Side
Section K-K
Section J-J
Downstream Elevation of Abutment "A"
Section I-I
Plan of Abutment "A"
Section L-L
Section H-H
NOTES
End Class Concrete

FIGURE 4



Contract No. 14.
Erie Canal
Sections 1 & 2
DETAIL PLANS OF ABUTMENTS "C" & "D"
& SECTIONS OF DAM 2,-CRESCENT
Section A-A
Section B-B
Section C-C
Section D-D
Section E-E
Section F-F
Section G-G
Downstream Elevation Abutment "D"
Elevation Abutment "D"
Elevation Abutment "C"
Plan Abutment "C"
Downstream Elevation Abutment "C"
Detail of Flashboard Socket & Cover
1st Class Concrete
2nd Class Concrete

FIGURE 5

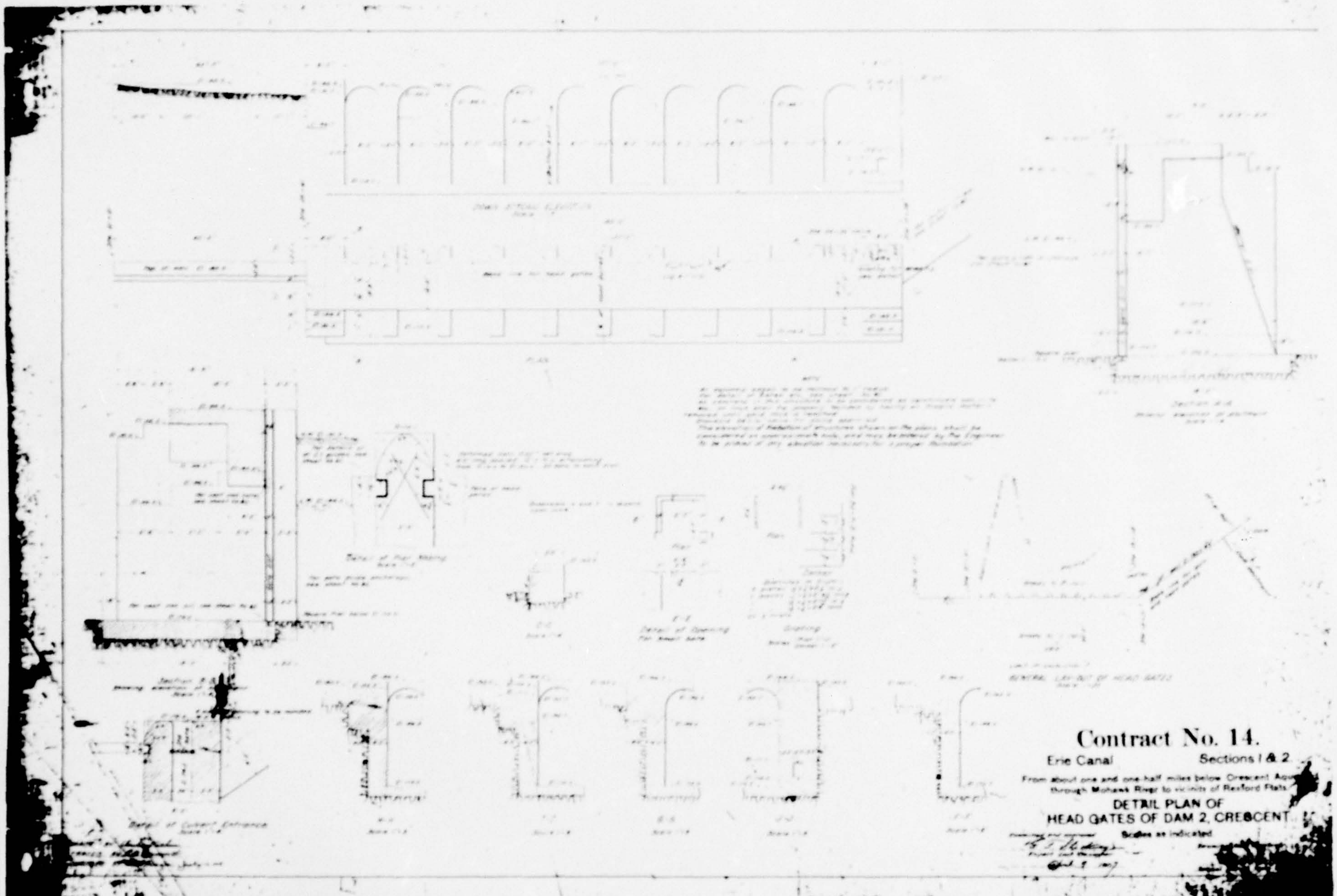

Contract No. 14.
Erie Canal
Sections 1 & 2
From about one and one-half miles below Crescent Aqu
through Mohawk River to vicinity of Rexford Flats
DETAIL PLAN OF
HEAD GATES OF DAM 2, CRESCENT
Scales as indicated

FIGURE 6

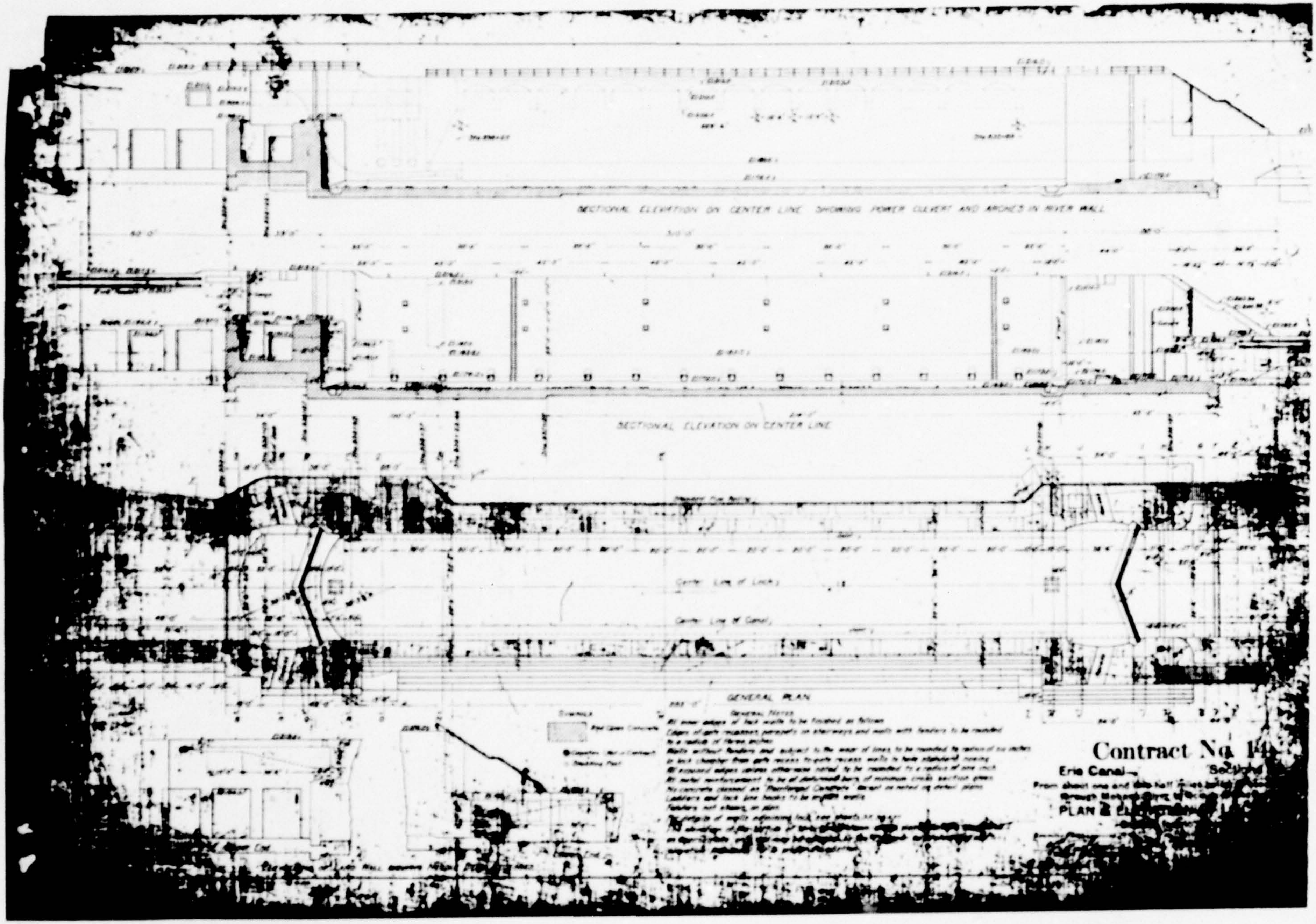

SECTIONAL ELEVATION ON CENTER LINE SHOWING POWER CULVERT AND ARCHES IN RIVER WALL
SECTIONAL ELEVATION ON CENTER LINE
Center Line of Locks
Center Line of Canal
GENERAL PLAN
General Notes
Contract No.
Erie Canal

FIGURE 7

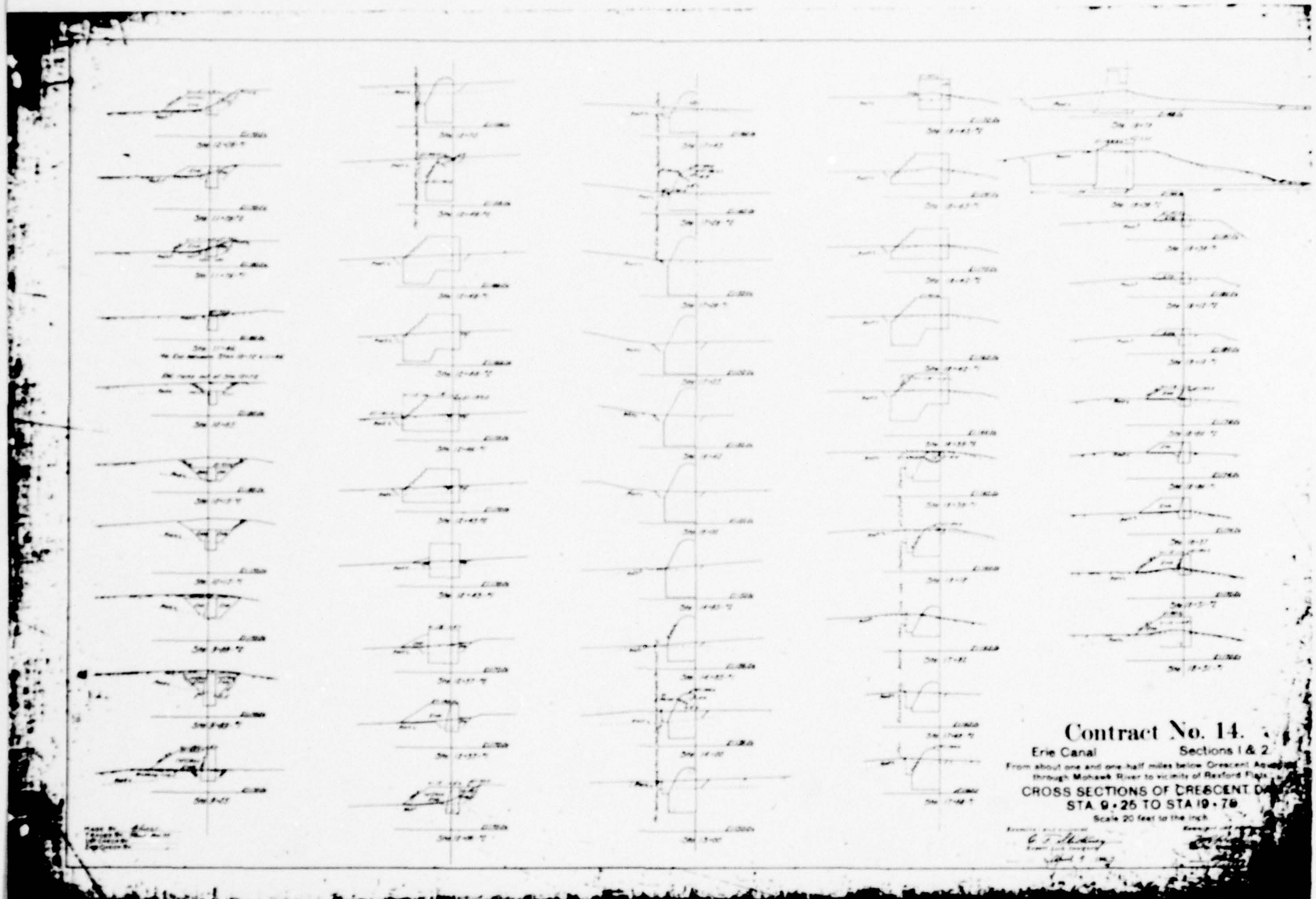

Contract No. 14.
Erie Canal
Sections 1 & 2
From about one and one-half miles below Crescent Aqueduct through Mohawk River to vicinity of Rexford Flats
CROSS SECTIONS OF CRESCENT DAM
STA. 9+25 TO STA 19+79
Scale 20 feet to the inch

FIGURE 8

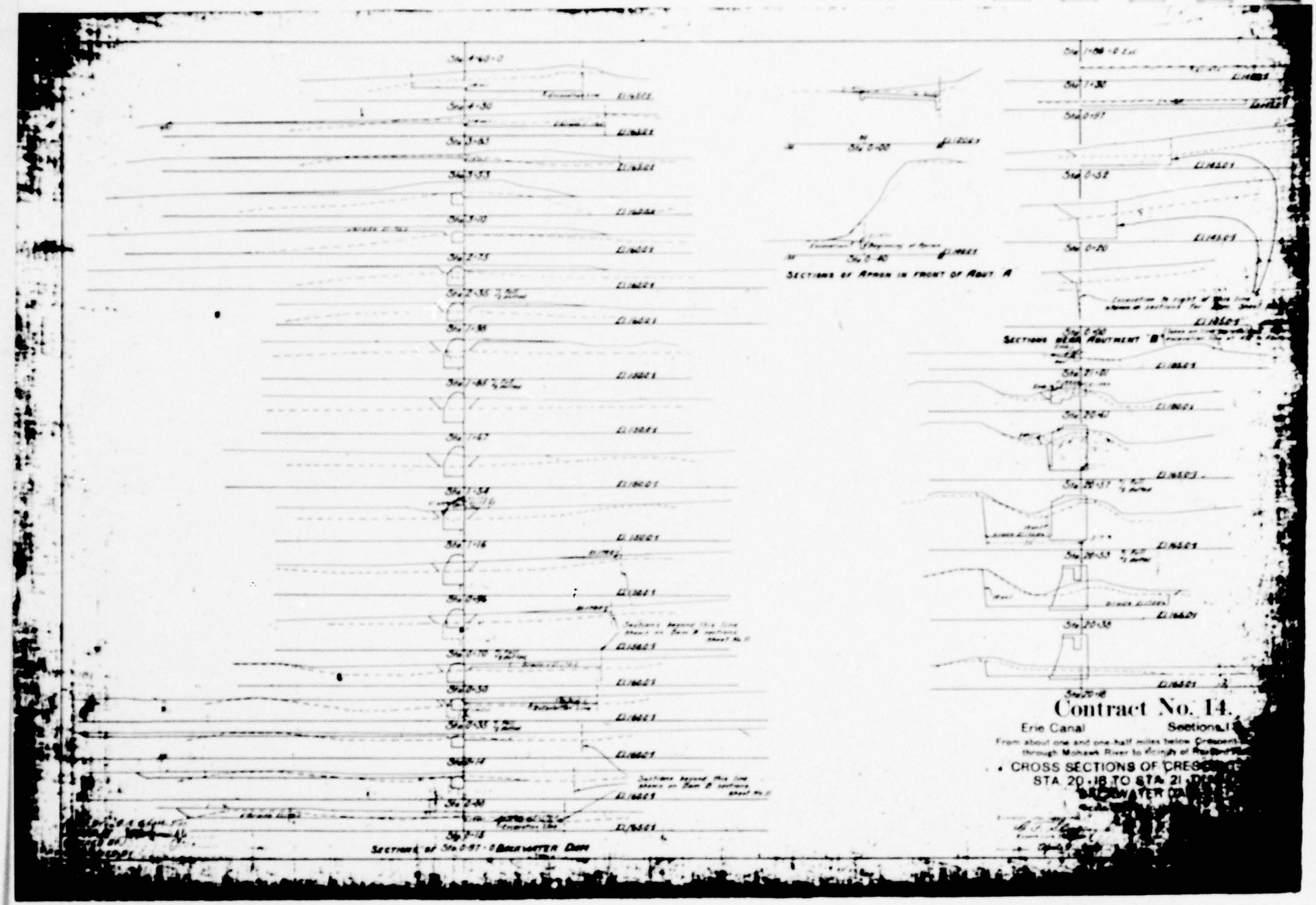

Contract No. 14.
Erie Canal
Sections of Apron in front of Abut. A

FIGURE 9

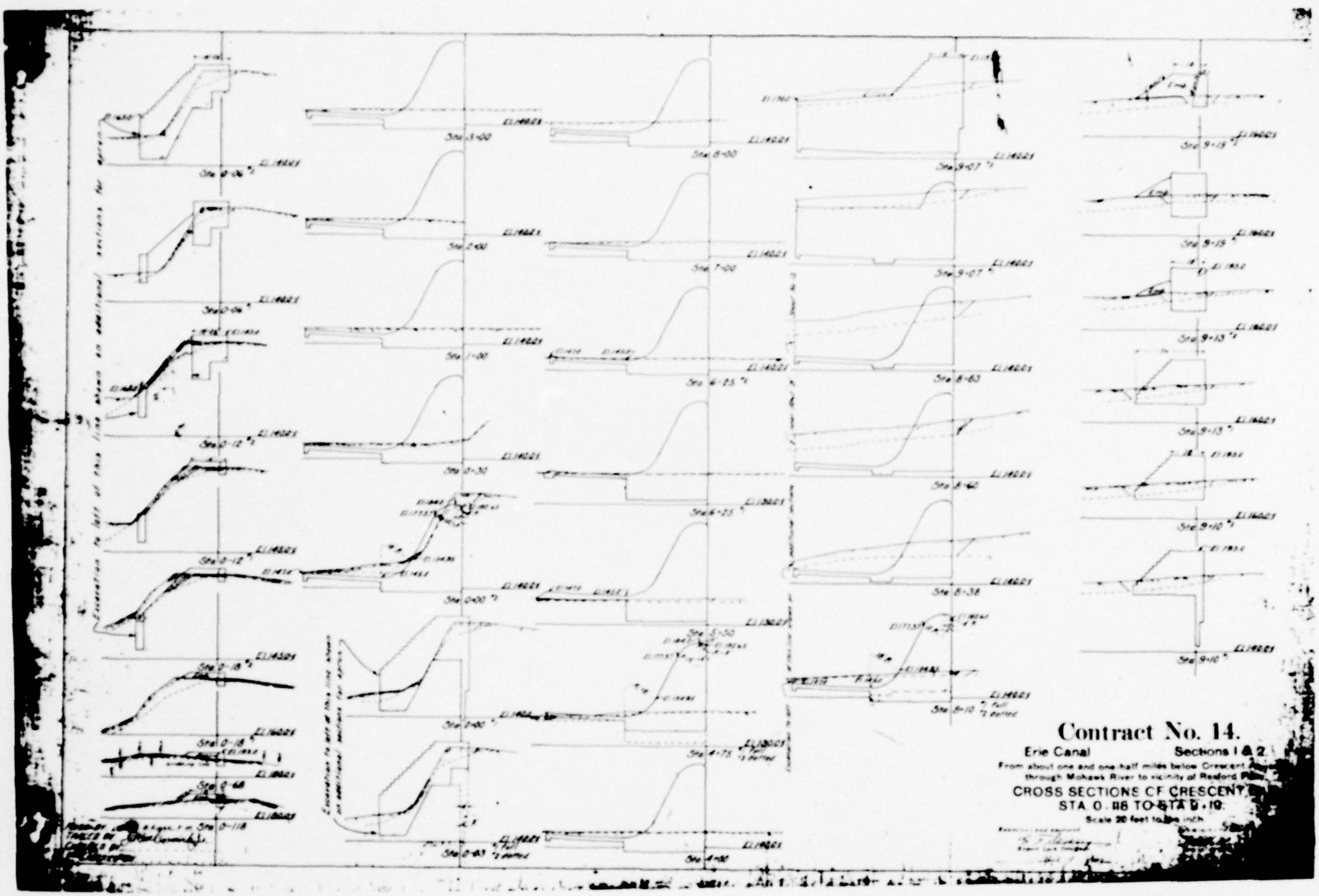
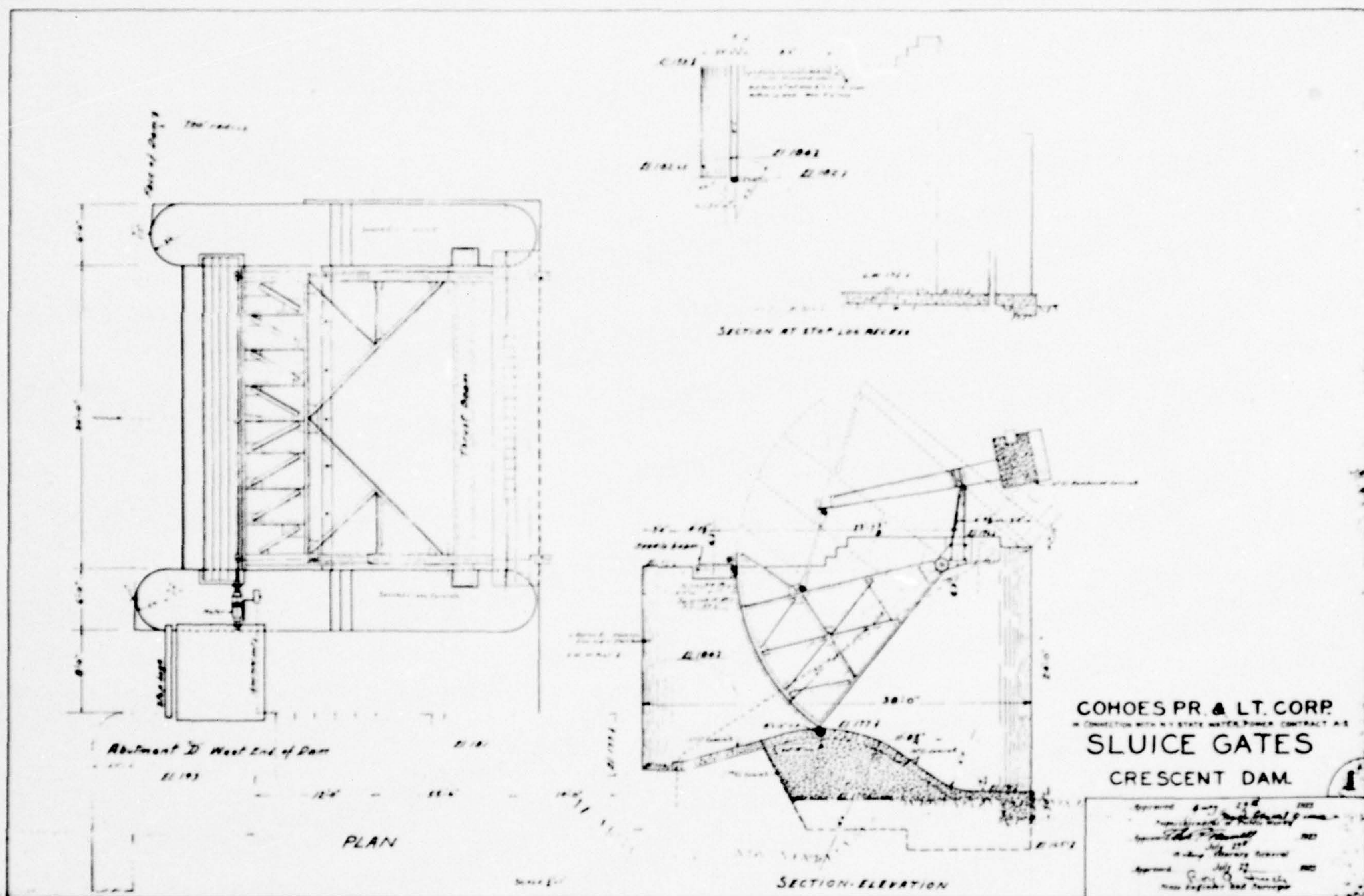
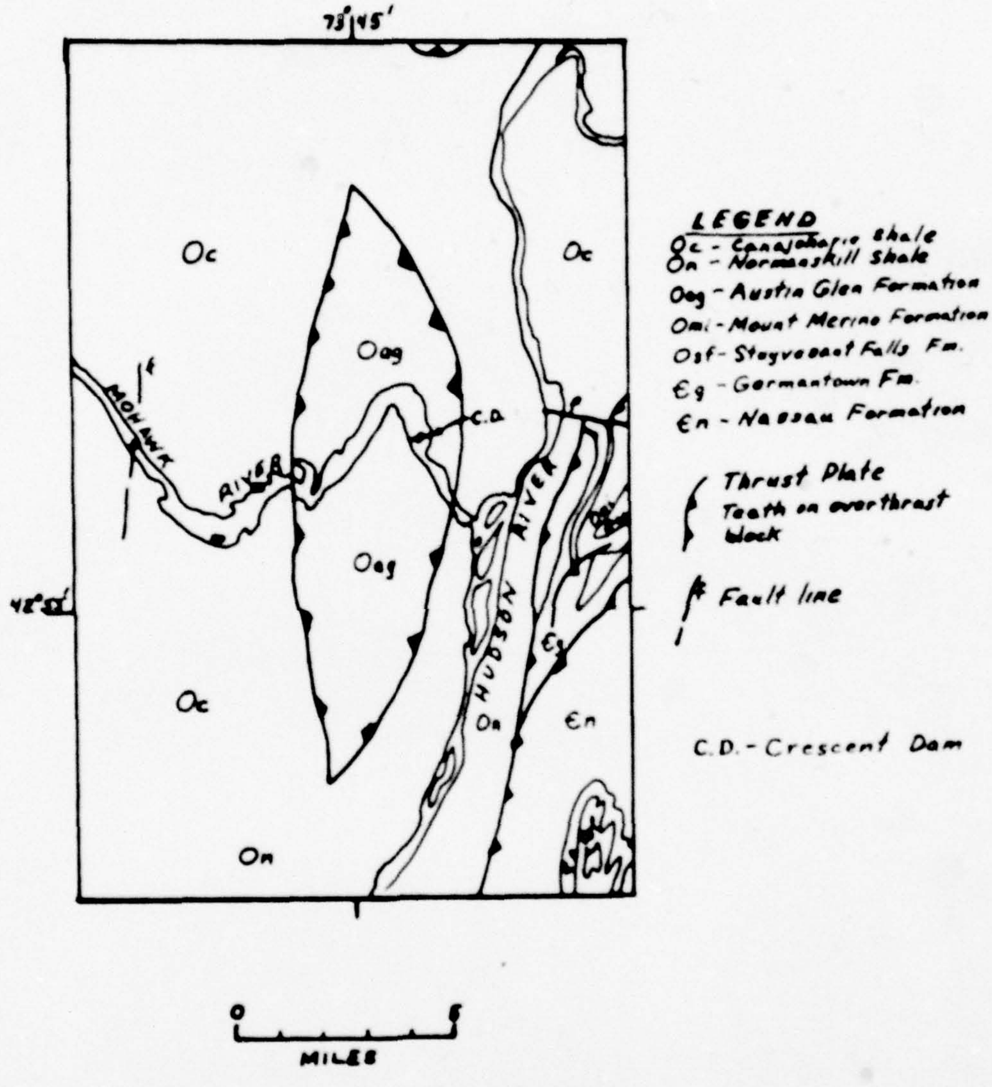

Contract No. 14.
Erie Canal
Sections 1 & 2
CROSS SECTIONS OF CRESCENT
STA. 0+18 TO STA 9+19
Scale 20 feet to the inch

FIGURE 10



Abutment 'D' West End of Dam
PLAN
SECTION AT STOP LOG RECESS
SECTION-ELEVATION
38'0"
COHOES PR. & LT. CORP.
SLUICE GATES
CRESCENT DAM.

FIGURE 11



STETSON · DALE	DATE 8-21-79	DRAWN HM	GEOLOGIC MAP
	JOB 2305	APP'D FIGURE 12	

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Crescent Dam **County** Albany/Saratoga **State** New York **ID #** NY171

Type of Dam Concrete Gravity **Hazard Category** High

Date(s) Inspection 1. August 1, 1979 **Weather** Sunny **Temperature** 90°
2. August 23, 1979

Pool Elevation at Time of Inspection 184.66* **M.S.L.** **Tailwater at Time of Inspection** 156.29*

* Barge Canal Datum

Inspection Personnel:

(1), (2) N. F. Dunlevy	Dale Engineering	(1) J. Hulchanski N.Y.S.D.O.T.
(1) F. W. Byszewski	Dale Engineering	(1) W. Elliot N.Y.S.D.O.T.
(1) D. F. McCarthy	Dale Engineering	
(1) H. Muskatt	Dale Engineering	
(2) J. A. Gomez	Dale Engineering	
(2) R. McCarty	N.Y.S.D.E.C. Dam Safety Section	

N.F. Dunlevy **Recorder**

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None	North abutment on north dam section has s[illegible] wetness on rock outcropping behind end of concrete wall.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Abutments tied to rock. Island abutments have concrete wall tying dam into island section.	North abutment of north dam wall below spillway severely eroded at water line. Wall undermined and exposed in back.
DRAINS	None	
WATER PASSAGES	Small stop log passage adjacent to south dams south section between tainter gate and abutment	Some leakage through stop logs - minor.
FOUNDATION	Bedrock both dam sections.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	South dam: Severe surface cracks & erosion along top horizontal cold joint. Surface erosion along length. North Dam: Limited deep surface erosion.	Surface cracks along south dam cold joint significant. North dam has what appears to be steel exposed at deep erosion.
STRUCTURAL CRACKING	None observed. Very close inspection prohibited due to tailwater condition.	
VERTICAL & HORIZONTAL ALIGNMENT	Good	
MONOLITH JOINTS	Significantly deteriorated in south dam. Flow through top portion of joints.	Depth of deterioration is visually up to 12 inches.
CONSTRUCTION JOINTS	Surface erosion is more significant along horizontal construction joints.	
STAFF GAGE OF RECORDER	None - Measure of discharge taken in power house.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A	
ANY NOTICEABLE SEEPAGE	N/A	
STAFF GAGE AND RECORDER	N/A	
DRAINS	N/A	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR Entire dam, both north and south sections.	See sheets 2 and 3	
APPROACH CHANNEL	Consists of entire reservoir.	
DISCHARGE CHANNEL	Consists of entire river width.	
BRIDGE AND PIERS	None.	

GATED SPILLWAY

Tainter gate - South end of south dam section

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Downstream view shows concrete in fair condition.	Immediately below south spillway section is located a small earlier dam. The south section is missing on this structure.
APPROACH CHANNEL	No observation given.	
DISCHARGE CHANNEL	Directly into river channel. An abandoned dam located just downstream from the gate has been breached.	
BRIDGE AND PIERS	None	
GATES AND OPERATION EQUIPMENT	Electrically operated gate.	Gates are quite rusty, although not heavil deteriorated. Leakage exists around sides gates.

OUTLET WORKS

Operates through powerhouse and tainter gate (sheet 7)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None	
INTAKE STRUCTURE	None	
OUTLET STRUCTURE	None	
OUTLET CHANNEL	None	
EMERGENCY GATE	None	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Unobstructed, no debris. Small dam immediately below south dam. N-M dam pool comes up to toe of north dam section.	
SLOPES	Pool of N-M dam on north section. Smaller south dam section has old dam and exposed bedrock channel below south section dam.	
APPROXIMATE NO. OF HOMES AND POPULATION	Approximately 12 residential structures and vacation cottages on north shore 15-20 feet above normal pool. N-M School Structure Station	
	1/2 mile downstream. City of Albany and Watervliet 3 miles downstream. Limited recreational use of reach below dam.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER		

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Not significant	
SEDIMENTATION	No observation	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM ____________________

ID # ____________________

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report
REGIONAL VICINITY MAP	See this report
CONSTRUCTION HISTORY	See this report
TYPICAL SECTIONS OF DAM	See this report
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report
RAINFALL/RESERVOIR RECORDS	At powerhouse available from New York State Department of Transportation

ITEM	REMARKS
DESIGN REPORTS	None
GEOLOGY REPORTS	None
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	---

ITEM	REMARKS
MONITORING SYSTEMS	---
MODIFICATIONS	New York State Department of Transportation reported
HIGH POOL RECORDS	New York State Department of Transportation reported
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	---
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported
MAINTENANCE OPERATION RECORDS	New York State Department of Transportation

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report
OPERATING EQUIPMENT PLANS & DETAILS	New York State Department of Transportation records and some information given in this report.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 3455 sq. mi.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 185.00 w/ flashboards
184.00 w/o flashboards

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ---

ELEVATION MAXIMUM DESIGN POOL: ---

ELEVATION TOP DAM: 193

CREST:

a. Elevation 185.00 w/ flashboards
184.00 w/o flashboards
b. Type Crested spillway
c. Width See sections in report
d. Length 1600 feet
e. Location Spillover Entire width
f. Number and Type of Gates 1 tainter gate

OUTLET WORKS:

a. Type through powerhouse
b. Location
c. Entrance Inverts
d. Exit Inverts
e. Emergency Draindown Facilities

HYDROMETEOROLOGICAL GATES:

a. Type ---
b. Location ---
c. Records ---

MAXIMUM NON-DAMAGING DISCHARGE: Stage 15-20 feet above normal

Form IWS1. 11-6-16-1000 (16-1038) Acc. file

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

225 C
23 Moh

DAM REPORT

June 12, 1916
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Crescent Dam No 2 Barge Canal Dam.

This dam is situated upon the Mohawk River (Give name of stream) in the Town of Waterford & Colonie Albany & Saratoga County, about one mile (State distance) from the Village ~~or City~~ of Crescent Station

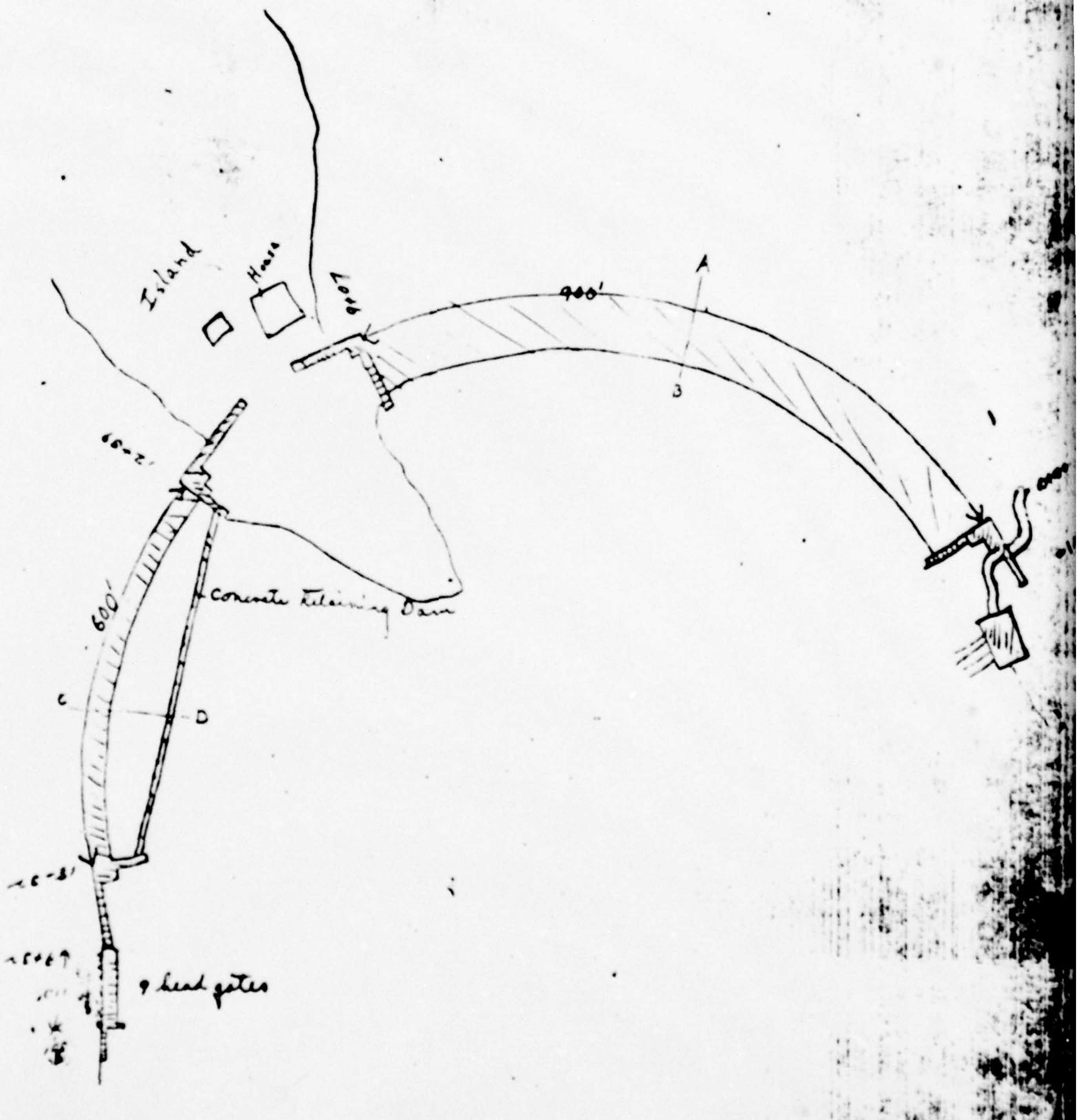
The distance down (Up or down) stream from the dam, to the Cohoes Falls (Give name of nearest important stream or of a bridge) is about 1½ mile (State distance).

The dam is now owned by State of New York (Give name and address in full) and was built in or about the year 1909, and was extensively repaired or reconstructed during the year ....

As it now stands, the spillway portion of this dam is built of concrete (State whether of masonry, concrete or timber) and the other portions are built of concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

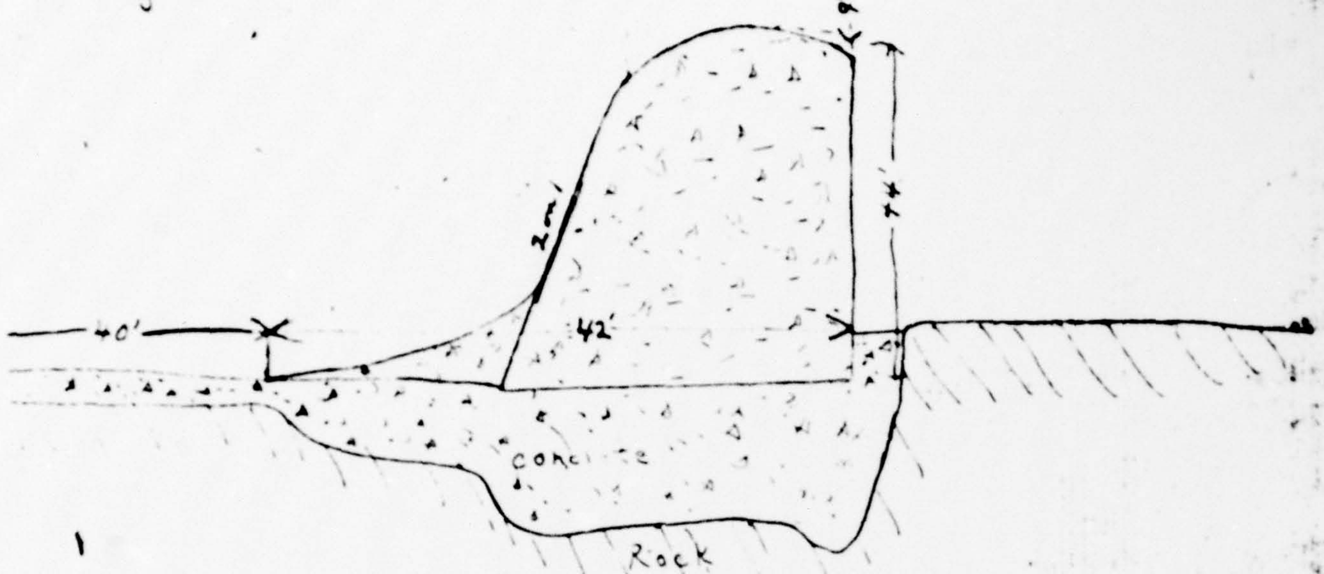
As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is rock and under the remaining portions such foundation bed is rock

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)

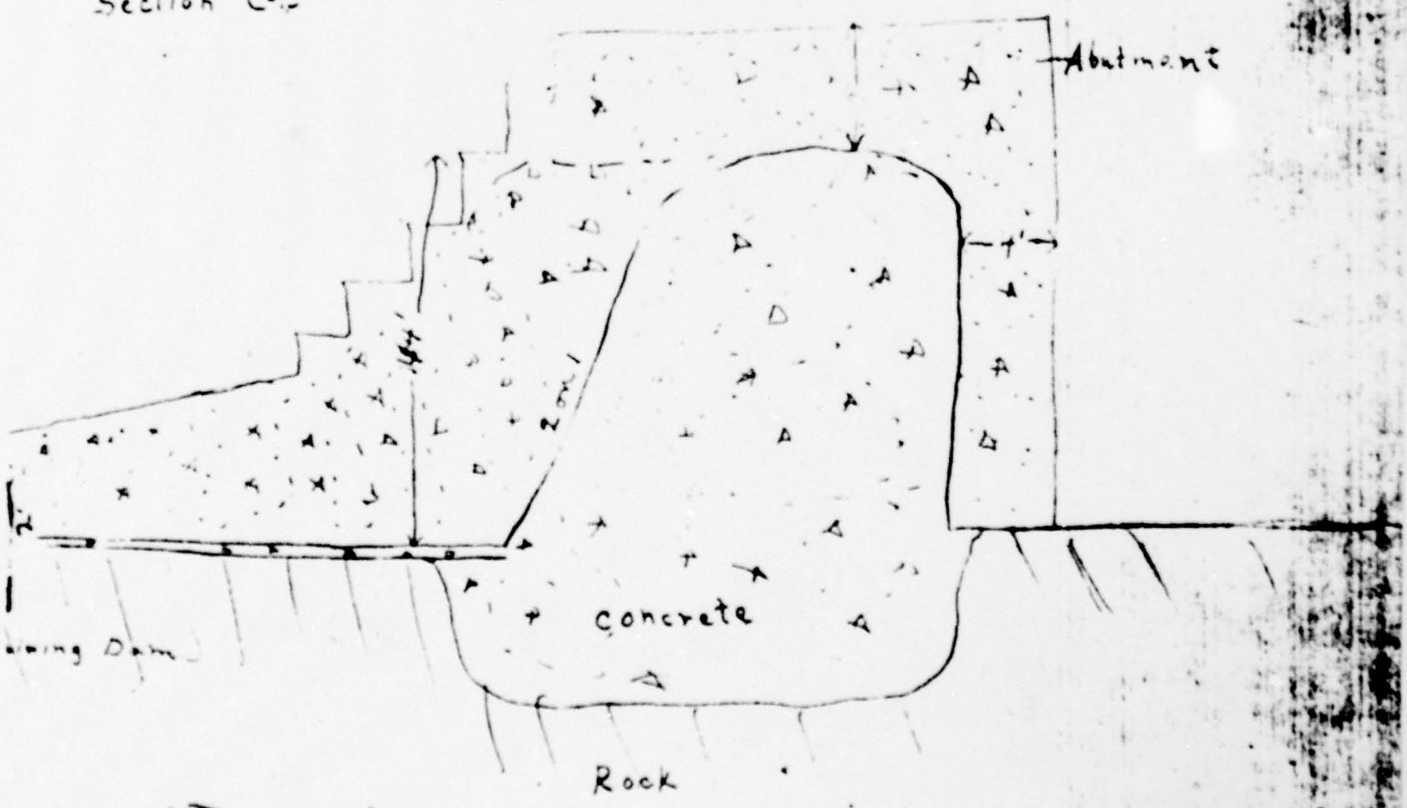


(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

Spillway Section A-B



Section C-D



Distance of retaining dam to main dam varies with the curvature.

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

August 22, 1979

Mr. Neal F. Dunlevy
Stetson-Dale
Bankers Trust Building
Utica, New York 13501

Subject: Browns Falls Dam National Dam
Safety Inspection

Dear Neal:

Enclosed is one copy each of the following items:

The total length of this dam is 2150 feet. The spillway or waste-weir portion, is about 1500 feet long, and the crest of the spillway is about 9' feet below the top of the dam.

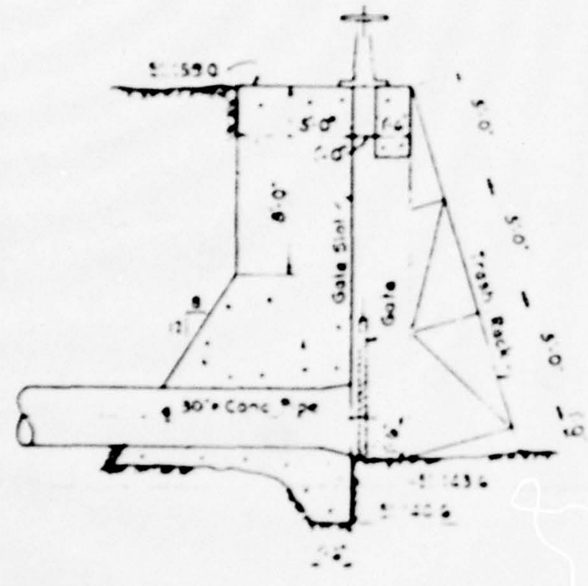
The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: 9 head gates (8'x10')

At the time of this inspection the water level above the dam was .... ft. 6 in.

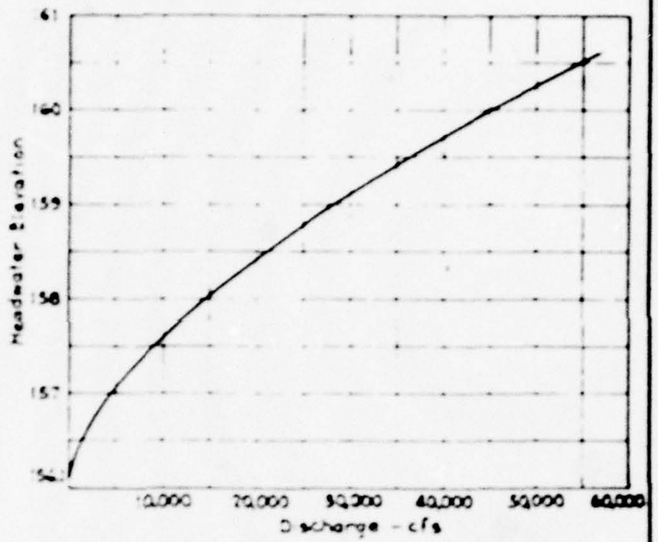
~~below~~
above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

Dam new and in good condition



SECTION 4-4



FLOOD DISCHARGE CAPACITY

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 20TH DAY OF AUGUST 1965

NIAGARA MOHAWK POWER CORPORATION

BY ______________

TITLE VICE PRESIDENT & CHIEF ENGINEER

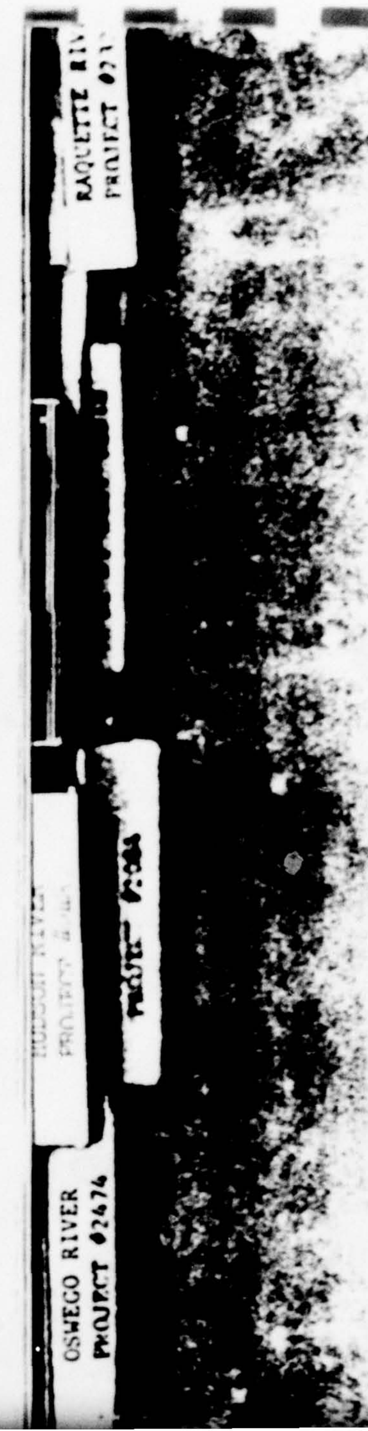
NIAGARA MOHAWK POWER CORPORATION

SYRACUSE, N.Y.

CONSTRUCTED SCHOOL STREET PROJECT

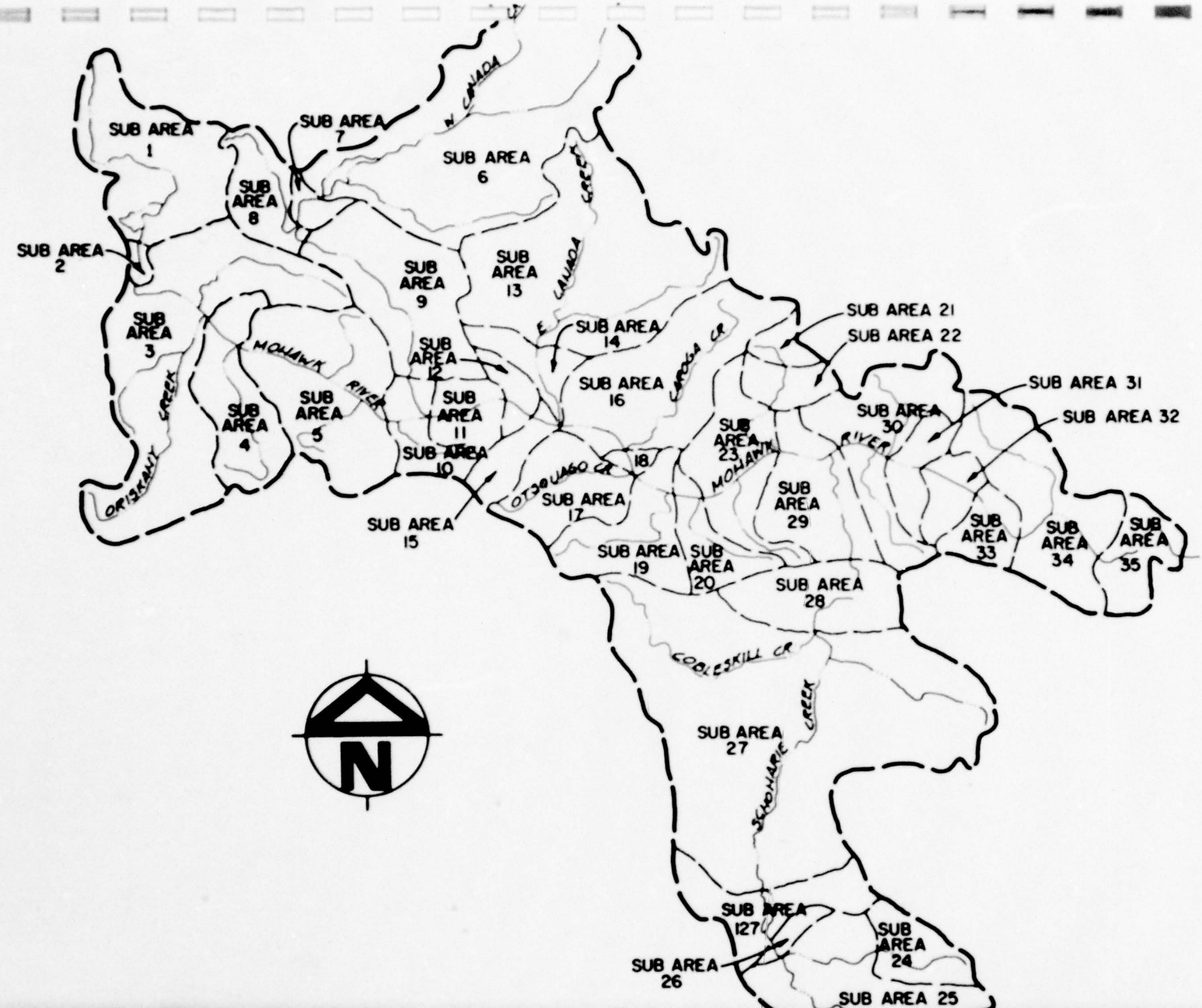
GENERAL PLAN AND DETAILS OF DAM

EXHIBIT "L" SHEET No. 1

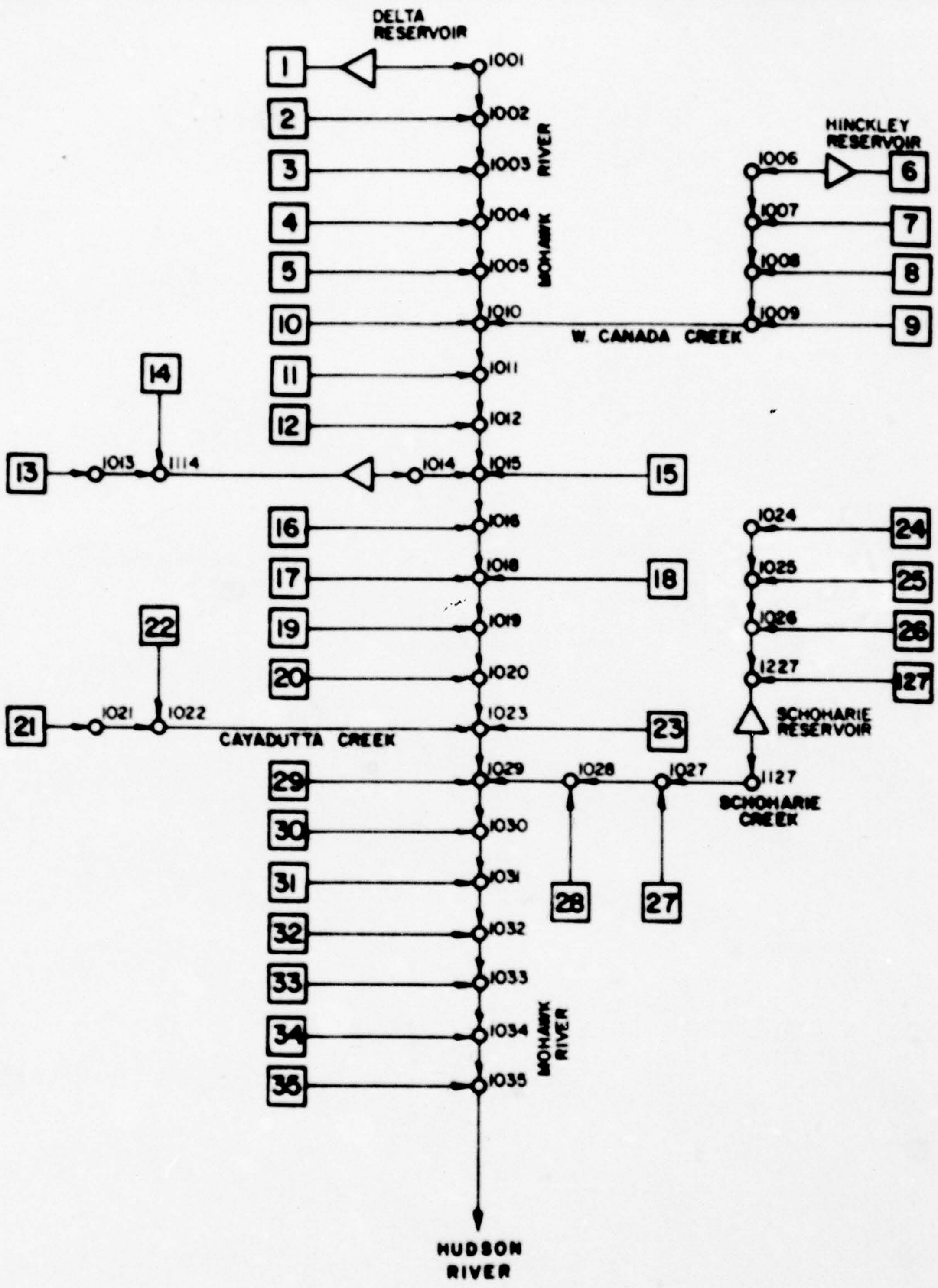


APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



SUB AREA 1
SUB AREA 2
SUB AREA 3
SUB AREA 4
SUB AREA 5
SUB AREA 6
SUB AREA 7
SUB AREA 8
SUB AREA 9
SUB AREA 10
SUB AREA 11
SUB AREA 12
SUB AREA 13
SUB AREA 14
SUB AREA 15
SUB AREA 16
SUB AREA 17
18
SUB AREA 19
SUB AREA 20
SUB AREA 21
SUB AREA 22
SUB AREA 23
SUB AREA 24
SUB AREA 25
SUB AREA 26
SUB AREA 27
SUB AREA 28
SUB AREA 29
SUB AREA 30
SUB AREA 31
SUB AREA 32
SUB AREA 33
SUB AREA 34
SUB AREA 35
SUB AREA 127
N CANADA CR
E CANADA CREEK
MOHAWK RIVER
ORISKANY CREEK
OTSQUAGO CR
CAROGA CR
COBLESKILL CR
SCHOHARIE CREEK
N



DELTA RESERVOIR
1
1001
2
1002
3
1003
4
1004
5
1005
MOHAWK RIVER
HINCKLEY RESERVOIR
1006
6
1007
7
1008
8
1009
9
10
1010
W. CANADA CREEK
11
1011
12
1012
14
13
1013
1114
1014
1015
15
16
1016
17
1018
18
19
1019
20
1020
22
21
1021
1022
CAYADUTTA CREEK
1023
23
1024
24
1025
25
1026
26
1227
127
SCHOHARIE RESERVOIR
29
1029
1028
1027
1127
SCHOHARIE CREEK
30
1030
31
1031
28
27
32
1032
33
1033
34
1034
35
1035
MOHAWK RIVER
HUDSON RIVER

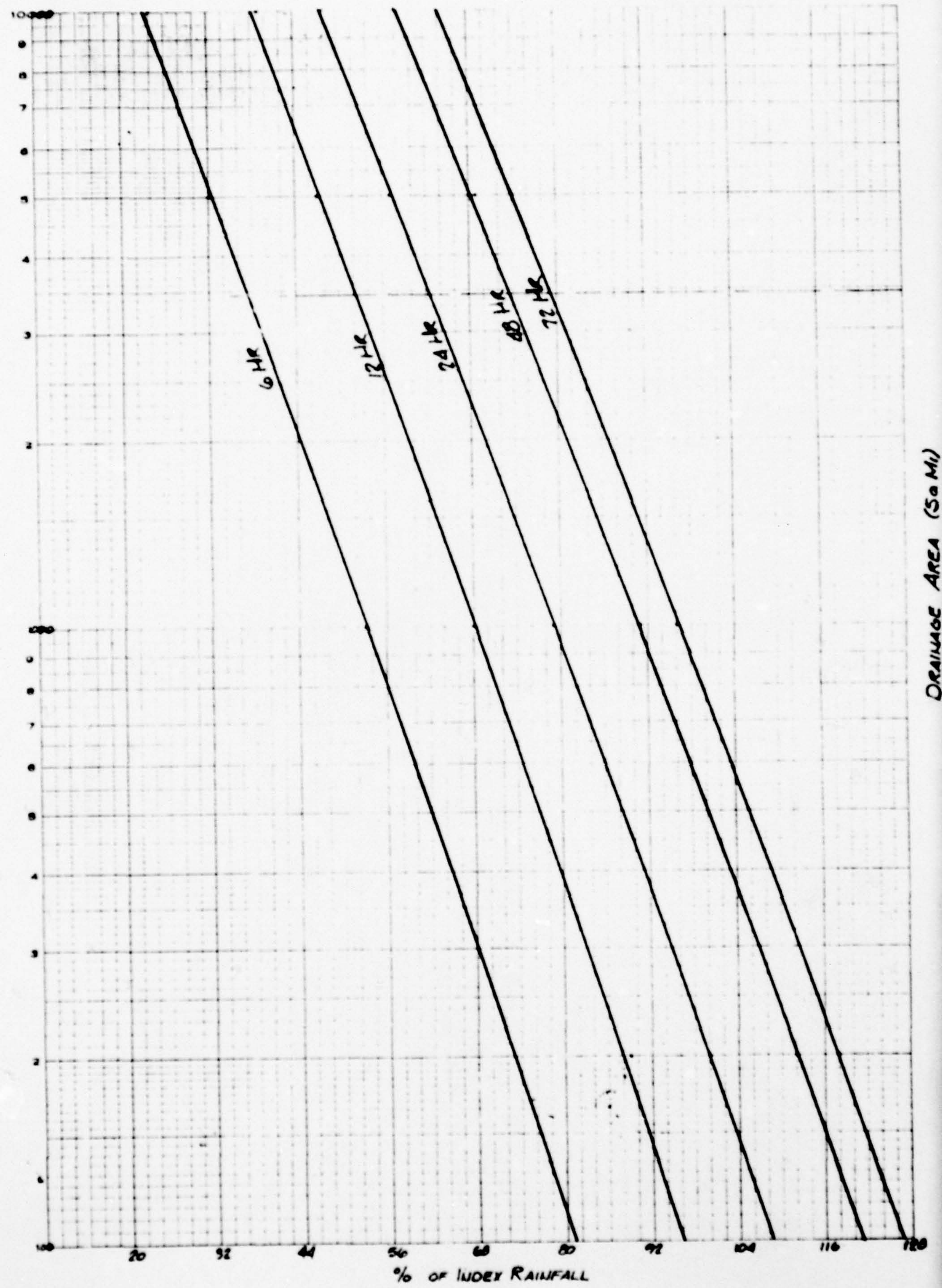
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 7-31-79
SUBJECT MOHAWK RIVER DRAINAGE BASIN PROJECT NO 230
DEPTH - AREA - DURATION RELATIONSHIP * DRAWN BY JPG

AREA	DURATION	DEPTH	% OF INDEX
200 SQ MI	6 HR	16.0	73
	12 HR	19.4	89
	24 HR	21.9	100 ← PMF INDEX RAIN
	48 HR	24.5	112
200 SQ MI	72 HR	25.9	118
1000 SQ MI	6 HR	11.5	53
	12 HR	14.8	68
	24 HR	17.3	79
	48 HR	20.0	91
1000 SQ MI	72 HR	21.0	96
5000 SQ MI	6 HR	7.0	32
	12 HR	10.3	47
	24 HR	12.5	57
	48 HR	15.1	69
5000 SQ MI	72 HR	16.3	74
10000 SQ MI	6 HR	5.3	24
	12 HR	8.6	39
	24 HR	10.5	48
	48 HR	12.8	58
10000 SQ MI	72 HR	14.0	64

* FROM HYDROMETEOROLOGICAL REPORT Nº 51
SEPT 1976

PMF	DURATION	% OF INDEX
	6 HR	37.5
	12 HR	52.0
	24 HR	62.5
	48 HR	73.5
	72 HR	79.0



10000
1000
100
20
32
44
56
68
80
92
104
116
128
6 HR
12 HR
24 HR
48 HR
72 HR
% OF INDEX RAINFALL
DRAINAGE AREA (SQ MI)

Table 6.1

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.
SUBBASIN CHARACTERISTICS

Subbasin No.	Area (mi^2)	Storage Area (% + 1.0)	Clark Coefficients		Snyder Coefficients		Recession Parameters	
			TC (hr)	R (hr)	LAG (hr)	CP (-)	QRCSN (cfs)	RTIOR (-)
1	150	1.02	15.0	7.3	12.3	.75	1900	1.3
2	7	1.00	7.0	4.5	5.9	.69	50	1.3
3	289	1.04	17.6	8.2	14.4	.76	4100	1.3
4	93	1.06	13.4	7.0	11.2	.74	1100	1.3
5	158	1.17	15.7	8.2	13.2	.75	2100	1.3
6	375	2.32	22.6	15.9	20.0	.58	5700	1.3
7	7	1.13	7.1	4.9	6.1	.66	50	1.3
8	53	1.03	11.6	6.2	9.7	.73	550	1.3
9	121	1.01	14.2	7.0	11.6	.75	1450	1.3
10	45	1.10	11.3	6.4	9.5	.72	500	1.3
11	27	1.03	9.8	5.6	8.2	.71	280	1.3
12	23	1.04	9.5	5.5	8.0	.72	250	1.3

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.
SUBBASIN 3-HOUR UNIT HYDROGRAPHS

Time (hrs)	1	2	3	4	5	6	7	8	9	10	11	12
3	698	152	953	527	623	478	136	409	632	354	291	266
6	2435	427	3354	1833	2192	1746	394	1407	2198	1217	970	877
9	4449	439	6314	3244	4083	3448	425	2325	3950	1995	1449	1275
12	5771	245	8818	3966	5474	5312	257	2474	4969	2075	1260	1061
15	5762	122	9963	3513	5782	6966	137	1850	4646	1530	772	625
18	4483	61	9342	2445	4838	8020	73	1134	3395	950	447	359
21	2953	30	7241	1580	3406	8365	39	695	2197	590	259	206
24	1945	15	4999	1021	2349	7813	21	426	1422	366	150	118
27	1281	7	3452	660	1620	6642	11	261	920	227	87	68
30	844		2383	426	1118	5495	6	160	595	141	50	39
33	556		1645	275	771	4547		98	385	88	29	22
36	366		1136	178	532	3762		60	249	54	17	13
39	241		784	115	367	3113		37	161	34		
42	159		541	74	253	2575		23	104	21		
45	105		374	48	175	2131			68			
48	69		258		120	1763						
51			178		83	1459						
54			123		57	1207						
57						999						
60						826						
63						684						
66						566						
69						468						
72						387						
75						320						
78						265						
81						219						
84						181						
87						150						
90						124						
93						103						
96						85						
99						70						

All flows in cfs/unit rainfall.

Table 6.3

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.
INITIAL FLOW AND INFILTRATION PARAMETERS

Subbasin No.	December, 1948			June, 1972			SPF and Transposed Agnes		
	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)
1	90	.50	.045	250	0.25	.045	250	1.0	.075
2	7	.50	.045	7	2.00	.075	7	2.0	.075
3	200	.50	.040	540	2.00	.125	540	2.0	.125
4	50	.50	.040	140	2.00	.125	140	2.0	.125
5	100	.50	.040	265	2.00	.100	265	2.0	.100
6	280	.25	.055	725	0.10	.040	725	1.0	.075
7	7	.25	.045	7	0.10	.020	7	1.0	.075
8	25	.25	.045	72	0.10	.040	72	1.0	.075
9	70	.25	.045	190	0.10	.045	190	1.0	.075
10	20	.20	.045	60	0.35	.075	60	2.0	.075
11	10	.10	.040	32	0.30	.050	32	1.0	.075
12	10	.10	.040	27	0.30	.050	27	1.0	.075

Table 6.4

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.

ROUTING REACH CHARACTERISTICS

Reach No.	Length (mi)	Slope (ft/mi)	Muskingum Parameters NSTEPS (-)	K (hrs.)	X (-)
1001-1002	5.2	8.7	1	1.0	.3
1002-1003	7.8	2.1	2	1.4	.3
1003-1004	5.2	2.1	1	2.0	.2
1004-1005	13.1	2.1	2	2.4	.2
1005-1010	3.9	2.1	1	1.5	.2
1006-1007		**	DUMMY LINK	**	
1007-1008		**	DUMMY LINK	**	
1008-1009	23.1	11.9	4	1.1	.3
1009-1010	4.4	14.1	1	0.7	.3
1010-1011	5.7	2.1	1	2.1	.2
1011-1012	4.6	2.1	1	1.7	.2

Table 6.5

DELTA RESERVOIR

Storage-Discharge Relationship

Elevation (ft. above MSL)	Storage (acre-ft)	Discharge (cfs)
550	62330	0
550.5	64170	337
551	65540	954
551.5	66920	1753
552	68750	2698
552.5	69900	3771
553	71500	4957
555	76770	10666
561.8	94617	30000

	Initial Storage Level (acre-ft)
December 1948	(not simulated)
June 1972	64170
SPF and Transposed Agnes	62330

Table 6.6

HINCKLEY RESERVOIR

Storage-Discharge Relationship

Elevation (ft. above MSL)	Storage (acre-ft)	Discharge (cfs)
1225	157900	0
1225.5	161100	474
1226	164540	1340
1226.5	167750	2462
1227	170960	3790
1227.5	174400	5297
1230	190670	14982
1239	211515	50000

Initial Storage Level (acre-ft)

December 1948	(not simulated)
June 1972	157900
SPF and Transposed Agnes	157900

Table 6.7

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.
SUBBASIN RAINFALL AND PEAK FLOWS

	December, 1948			June, 1972			SPF		Transposed Agnes		
	Rainfall (in)		Peak	Rainfall (in)		Peak	Rainfall (in)	Peak	Rainfall (in)		Peak
Subbasin	Total	Excess	Flow (cfs)	Total	Excess	Flow (cfs)	Total	Flow (cfs)	Total	Excess	Flow (cfs)
1	3.69	1.51	5866	4.14	2.50	10796	12.0	47388	11.3	8.1	30707
2	3.55	1.46	351	3.99	1.77	634	13.5	8259	10.7	5.7	1095
3	3.38	1.03	5125	3.94	1.28	10536	11.4	69424	10.7	3.9	25050
4	3.62	1.37	2651	4.17	1.46	4670	12.4	30463	10.7	3.9	9068
5	3.62	1.44	4373	3.76	1.33	6029	12.0	44203	11.9	7.6	30068
6	5.42	2.40	9767	4.07	2.40	13693	11.2	63107	14.0	10.7	69847
7	4.96	2.47	475	2.53	1.82	572	13.5	4023	12.7	9.5	2227
8	4.34	2.19	3132	2.57	1.26	2627	12.8	21441	12.4	9.2	13350
9	4.41	1.95	4417	3.59	1.83	5471	12.2	40602	13.3	10.0	30669
10	3.28	1.05	1171	3.28	0.87	1266	12.9	18330	12.6	8.9	11482
11	3.55	1.40	889	2.40	1.14	628	13.2	12558	13.3	10.2	8152
12	3.72	1.60	809	2.28	1.24	601	13.3	10996	13.7	10.6	7269

Table 6.8

MOHAWK BASIN ABOVE LITTLE FALLS, N.Y.

SIMULATED PEAK FLOWS AT CONTROL POINTS
(All Flows in cfs)

Control Point	Description	December 1948	June 1972	SPF	Transposed Agnes	Drainage Area (mi^2)
1001	Mohawk R. at Delta Dam, USGS 3360	651[R]	6335[R]	28630	21819	150
1002	Mohawk R. at Rome, NY above Barge Canal	869	6549	28733	22539	157
1003	Mohawk R. at Oriskany, NY	5720	17016	83307	47381	446
1004	Mohawk R. at Utica, NY	8317	20029	96011	54269	539
1005	Mohawk R. at Ilion, NY	12254	22693	112525	66034	697
1006	W. Canada Cr. below Hinckley Reservoir, USGS 3440	300[R]	6600	35759	45461	375
1007	W. Canada Cr. at Trenton Falls, NY	775	6648	35759	45511	382
1008	W. Canada Cr. below Cincinnati Cr.	3848	7114	36264	46977	435
1009	W. Canada Cr. at Kast Bridge, USGS 3460	8054	9408	58143	58538	556
1010	Mohawk R. below W. Canada Cr.	16903	31438	151042	125403	1298
1011	Mohawk R. at Little Falls, NY	17258	31204	150221	125863	1325
1012	Mohawk R. at Little Falls, USGS 3470	17413	31132	149572	126143	1348

R = Assumed Regulated Discharge

Table 6.11

MOHAWK RIVER, LITTLE FALLS, N.Y. TO MOUTH
SUBBASIN CHARACTERISTICS

Subbasin No.	Area (mi^2)	Storage Area (% + 1.0)	Clark Coefficients		Snyder Coefficients		Recession Parameters	
			TC (hr)	R (hr)	LAG (hr)	CP (-)	QRCSN (cfs)	RTIOR (-)
13	261	1.01	17.1	7.9	14.0	.77	3650	1.3
14	30	1.01	10.0	5.6	8.3	.71	320	1.3
15	35	1.03	10.5	5.9	8.9	.73	400	1.3
16	151	3.25	18.6	17.9	17.4	.59	3500	1.3
17	59.2	1.01	11.9	6.3	10.0	.74	600	1.3
18	13.1	1.08	8.2	5.2	7.0	.69	100	1.3
19	72	1.00	12.4	6.4	10.3	.74	700	1.3
20	55	1.05	11.8	6.4	9.9	.74	550	1.3
21	12.7	1.39	8.6	6.3	7.4	.65	120	1.3
22	23	1.12	9.6	5.9	8.2	.70	250	1.3
23	84	1.07	13.1	6.9	11.1	.74	870	1.3
24	39.3	1.18	11.1	6.6	9.4	.70	420	1.3
25	186.5	1.14	16.2	8.2	13.4	.74	2500	1.3
26	10.2	1.00	7.7	4.7	6.3	.69	70	1.3
127	78	1.09	13.0	6.9	10.9	.74	800	1.3
27	491	1.19	20.8	9.9	17.2	.76	6800	1.3
28	78	1.02	12.8	6.6	10.5	.74	800	1.3
29	87	1.03	13.1	6.8	11.0	.75	920	1.3
30	103	1.90	15.6	11.1	13.8	.67	1150	1.3
31	28	1.06	10.0	5.8	8.3	.71	300	1.3
32	32	2.14	11.7	10.2	10.4	.61	350	1.3
33	38	1.02	10.7	5.9	9.0	.73	400	1.3
34	108	1.39	14.8	8.8	12.6	.71	1250	1.3
35	33	1.07	10.4	6.0	8.9	.73	370	1.3

Table 6.12

MOHAWK BASIN, LITTLE FALLS, N.Y. TO MOUTH
SUBBASIN 3-HOUR UNIT HYDROGRAPHS

Time (hrs)	13	14	15	16	17	18	19	20	21	22	23	24
3	933	313	332	231	442	195	492	409	152	249	496	309
6	3275	1047	1124	847	1520	610	1696	1410	494	827	1723	1065
9	6134	1585	1752	1684	2536	771	2893	2350	676	1226	3026	1739
12	8443	1408	1644	2535	2767	554	3313	2550	540	1055	3645	1786
15	9333	881	1089	3156	2113	306	2660	1944	333	648	3151	1310
18	8411	511	645	3395	1296	170	1679	1204	205	384	2144	827
21	6264	296	382	3168	795	94	1042	746	127	227	1380	522
24	4260	172	226	2697	488	52	647	462	78	135	889	329
27	2898	100	134	2280	299	29	402	286	48	80	572	208
30	1971	58	79	1928	183	16	249	177	30	47	368	131
33	1341	33	47	1630	113	9	155	110	18	28	237	83
36	912	19	28	1378	69		96	68	11	17	153	52
39	620		17	1165	42		60	42	7		98	33
42	422			985	26		37	26			63	21
45	287			833							41	
48	195			704								
51	133			595								
54	90			503								
57				425								
60				360								
63				304								
66				257								
69				217								
72				184								
75				155								
78				131								
81				111								
84				94								
87				79								
90				67								
93				57								
96				48								
99				41								
102				34								
105				29								

All flows in cfs/unit rainfall.

Table 6.12 (Cont'd)

Time (hrs)	25	26	127	27	28	29	30	31	32	33	34	35
3	695	183	469	1080	502	525	313	289	162	350	434	311
6	2446	548	1630	3848	1735	1820	1124	967	579	1187	1535	1053
9	4579	629	2850	7363	2998	3185	2148	1465	1013	1869	2851	1641
12	6221	401	3405	10879	3513	3821	2967	1304	1177	1789	3771	1539
15	6721	208	2906	13431	2912	3280	3259	821	1013	1208	3855	1023
18	5814	108	1958	14333	1895	2209	2898	483	753	718	3125	613
21	4204	56	1262	13446	1192	1405	2239	284	560	426	2223	367
24	2907	29	814	10867	750	894	1708	167	416	253	1576	220
27	2010	15	524	7999	472	569	1302	98	309	150	1117	132
30	1389	8	338	5889	297	362	993	58	230	89	792	79
33	961		218	4335	187	230	758	34	171	53	562	47
36	664		140	3191	118	147	578	20	127	32	398	28
39	459		91	2349	74	93	441		94	19	282	17
42	317		58	1729	47	59	336		70		200	
45	219		38	1273		38	256		52		142	
48	152			937			195		39		101	
51	105			690			149		29		71	
54	73			508			114		21		51	
57				374			87		16		36	
60				275			66		12			
63				203			50					
66				149			38					
69							29					

Table 6.13
MOHAWK RIVER, LITTLE FALLS, N.Y. TO MOUTH
INITIAL FLOW AND INFILTRATION PARAMETERS

Subbasin No.	December, 1948 Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	June, 1972 Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)	SPF and Transposed Agnes Initial Flow (cfs)	Initial Loss (in)	Constant Loss (in/hr)
13	180	0.10	0.04	480	0.10	0.02	480	1.0	0.075
14	12	0.10	0.04	37	0.10	0.02	37	1.0	0.075
15	15	0.10	0.04	44	0.10	0.02	44	1.0	0.075
16	90	0.40	0.04	250	0.50	0.05	250	1.0	0.075
17	29	0.40	0.04	82	0.50	0.05	82	1.0	0.075
18	8	0.40	0.04	14	0.50	0.05	14	1.0	0.075
19	36	0.40	0.04	103	0.50	0.05	103	1.0	0.075
20	26	0.40	0.04	75	0.50	0.05	75	1.0	0.075
21	8	0.40	0.05	13	1.30	0.05	13	1.3	0.075
22	10	0.40	0.05	27	1.30	0.05	27	1.3	0.075
23	44	0.40	0.05	125	1.00	0.03	125	1.0	0.075
24	13	0.50	0.055	51	2.00	0.03	51	2.0	0.075
25	120	0.50	0.05	320	2.00	0.013	320	2.0	0.075
26	8	0.50	0.05	10	1.50	0.05	10	1.5	0.075
127	42	0.50	0.055	115	1.50	0.05	115	1.5	0.075
27	380	0.50	0.055	1010	1.25	0.01	1010	1.25	0.075
28	40	0.50	0.05	115	1.25	0.01	115	1.25	0.075
29	46	0.50	0.04	132	1.10	0.04	132	1.1	0.075
30	57	0.10	0.05	160	0.70	0.05	160	1.0	0.075
31	11	0.10	0.05	34	0.70	0.05	34	1.0	0.075
32	13	0.10	0.05	40	0.25	0.04	40	1.0	0.075
33	17	0.10	0.05	49	0.25	0.04	49	1.0	0.075
34	60	0.10	0.05	170	0.25	0.04	170	1.0	0.075
35	13	0.10	0.05	41	0.25	0.04	41	1.0	0.075

Table 6.14

MOHAWK RIVER, LITTLE FALLS, N.Y. TO MOUTH

ROUTING REACH CHARACTERISTICS

Reach No.	Length (mi)	Slope (ft/mi)	Muskingum Parameters NSTEPS (-)	K (hrs.)	X (-)
1012-1015	2.3	2.1	1	0.9	.2
1013-1114		**	DUMMY LINK	**	
1114-1014	(Kyser and E. Canada Lakes)		1	14.0	.0
1014-1015	1.4	14.3	1	1.0	.2
1015-1016	6.6	2.1	1	2.5	.2
1016-1018	2.5	2.1	1	1.0	.2
1017-1018		**	DUMMY LINK	**	
1018-1019	3.3	2.1	1	1.2	.2
1019-1020	3.1	2.1	1	1.2	.2
1020-1023	8.3	2.1	2	1.6	.2
1021-1022		**	DUMMY LINK	**	
1022-1023	8.5	41.5	1	1.4	.3
1023-1029	5.5	2.1	1	2.5	.2
1024-1025	12.2	27.9	1	1.3	.3
1025-1026		**	DUMMY LINK	**	
1127-1027	33.0	11.8	4	1.4	.3
1027-1028	6.6	9.1	1	1.2	.2
1028-1029	15.2	15.3	1	2.1	.2
1029-1030	5.6	2.1	1	2.1	.2
1030-1031	3.4	2.1	1	1.3	.2
1031-1032	5.6	2.1	1	2.1	.2
1032-1033	8.0	2.1	2	1.5	.2
1033-1034	9.5	2.1	2	1.8	.2
1034-1035	10.2	13.1	1	1.5	.2

Table 6.15

SCHOHARIE RESERVOIR

Storage-Discharge Relationship

Elevation (ft. above MSL)	Storage (acre-ft)	Discharge (cfs)
1130	60660	0
1131	61750	3480
1132	62840	9890
1133	63920	18160
1134	65010	27960
1135	66100	39080
1139.6	71091	90000

	Initial Storage Level (acre-ft)
December 1948	15530
June 1972	60660
SPF and Transposed Agnes	60660

Table 6.16

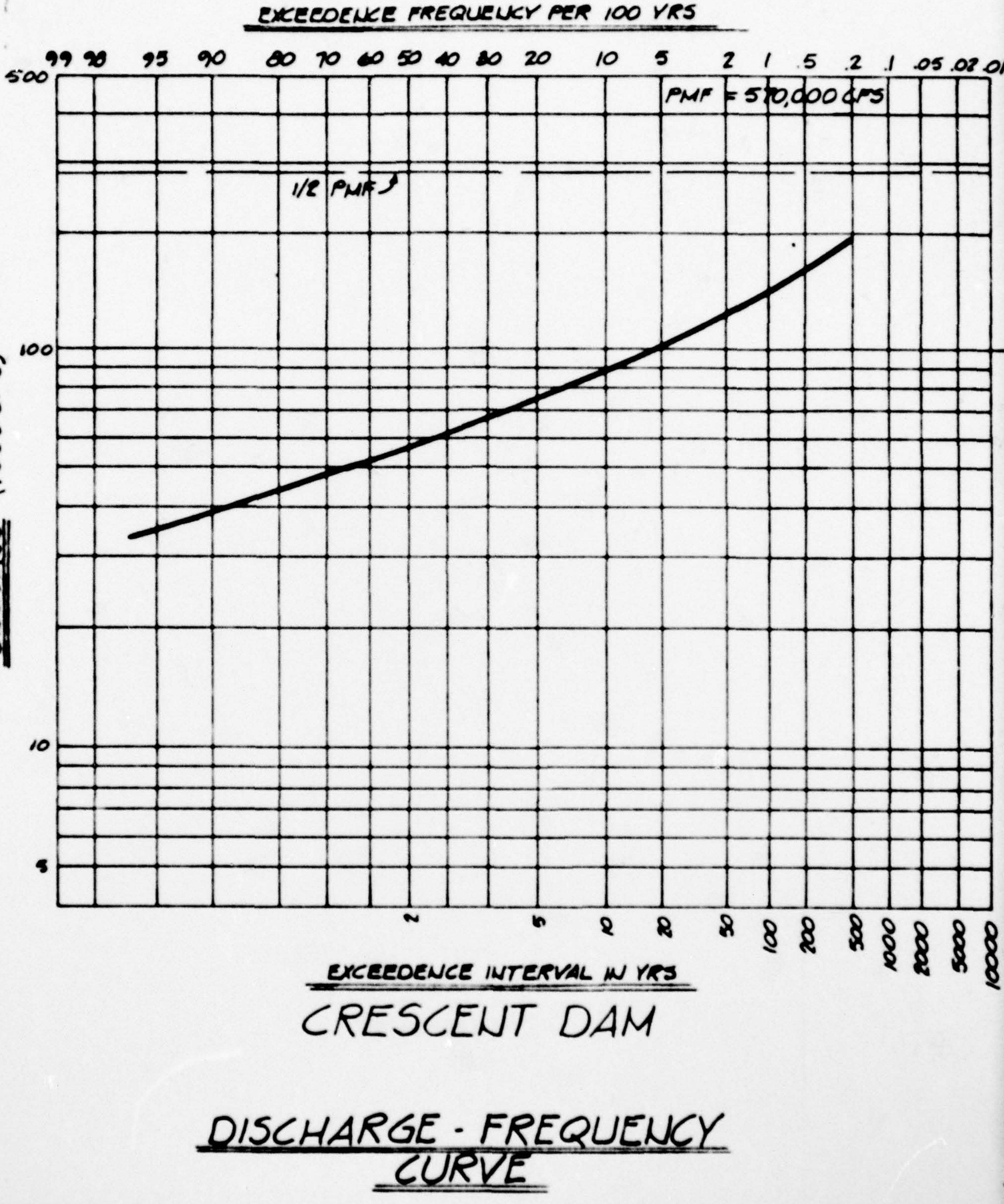
MOHAWK BASIN, LITTLE FALLS, N.Y. TO MOUTH
SUBBASIN RAINFALL AND PEAK FLOWS

Subbasin	December, 1948 Rainfall (in) Total	December, 1948 Rainfall (in) Excess	December, 1948 Peak Flow (cfs)	June, 1972 Rainfall (in) Total	June, 1972 Rainfall (in) Excess	June, 1972 Peak Flow (cfs)	SPF Rainfall (in) Total	SPF Peak Flow (cfs)	Transposed Agnes Rainfall (in) Total	Transposed Agnes Rainfall (in) Excess	Transposed Agnes Peak Flow (cfs)
13	4.53	2.24	8000	2.52	1.65	8711	11.5	70974	13.9	10.7	68095
14	3.76	2.14	1435	2.03	1.59	850	13.1	13765	14.0	10.8	9576
15	3.43	1.17	953	1.69	1.27	756	13.1	15449	13.6	10.5	10565
16	4.34	1.83	3731	2.76	1.48	1810	12.0	27889	14.0	10.8	27973
17	3.98	1.56	2165	2.56	1.45	1490	12.7	23618	14.3	11.2	18047
18	4.07	1.58	429	2.90	1.78	510	13.4	6875	15.3	12.2	4895
19	4.53	2.04	3611	2.67	1.58	1955	12.6	27614	13.9	10.7	20949
20	4.40	2.13	2498	2.43	1.24	1096	12.8	21927	13.2	10.0	15206
21	5.19	2.11	511	3.36	1.68	366	13.4	5981	11.6	8.6	3973
22	5.12	2.05	957	3.36	1.69	679	13.3	10655	11.9	8.9	7538
23	4.54	1.60	3364	2.68	1.39	1500	12.5	30114	13.1	10.0	22043
24	6.03	2.97	2469	7.16	4.59	2740	13.0	15973	11.0	7.4	9154
25	5.92	3.07	10185	6.18	3.99	16152	11.8	52595	11.1	7.0	29251
26	4.46	1.76	505	3.85	1.73	446	13.4	5747	11.1	7.2	2076
127	4.46	1.40	2589	3.89	1.78	2573	12.5	28157	10.7	6.8	12464
27	4.48	1.40	12611	3.08	1.57	6670	10.9	103558	12.0	8.1	81426
28	4.47	2.01	3832	2.63	1.44	1412	12.5	29052	14.8	11.5	23896
29	5.24	3.01	6098	2.40	1.03	1173	12.4	31436	12.9	9.9	28406
30	5.76	3.17	6387	2.88	1.51	2202	12.3	27188	11.4	8.5	22887
31	5.59	3.03	2090	2.64	1.28	791	13.2	12756	11.1	8.2	8521
32	5.24	2.68	1864	2.31	0.61	426	13.1	10381	10.8	8.2	7702
33	5.24	2.68	2576	2.27	0.58	518	13.0	16684	10.5	8.0	11416
34	5.40	2.84	6716	2.39	0.60	1175	12.3	32452	8.4	5.9	19529
35	5.85	3.46	3170	1.59	0.54	404	13.1	14498	6.8	4.1	4479

Table 6.17

MOHAWK RIVER, LITTLE FALLS, N.Y. TO MOUTH
SIMULATED PEAK FLOWS AT CONTROL POINTS
(All Flows in cfs)

Control Point	Description	December 1948	June 1972	SPF	Transposed Agnes	Drainage Area (mi^2)
1013	E. Canada Cr. at Dolgeville, N.Y.	8000	8711	70974	68095	261
1014	E. Canada Cr. at East Creek, USGS 3480	6907	5615	46206	52369	291
1015	Mohawk R. below E. Canada Cr	23401	36010	183761	176014	1674
1016	Mohawk R. Below Caroga Cr.	25026	36651	194176	196968	1825
1017	Otsquago Cr. at Fort Plain, USGS 3490	2156	1490	23618	18047	59.2
1018	Mohawk R. Below Otsquago Cr.	26324	37158	195199	203707	1897.3
1019	Mohawk R. Below Canajoharie Cr.	29087	37673	196138	212635	1969.3
1020	Mohawk R. at Sprakers, N.Y.	30862	37899	196354	218553	2024.3
1021	Cayadutta Cr. at Gloversville, N.Y.	511	366	5981	3973	12.7
1022	Cayadutta Cr. at Johnstown, N.Y.	1467	1045	16289	11498	35.7
1023	Mohawk R. Below Cayadutta Cr.	33528	38595	195513	229900	2144
1024	Batavia Kill at Windham, N.Y.	2469	2740	15973	9154	39.3
1025	Schoharie Cr. Below Batavia Kill	12391	18784	64462	37654	225.8
1026	Schoharie Cr. at Prattsville, USGS 3500	12664	19025	66414	39513	236
1127	Schoharie Res. Outflow at Gilboa Dam	2073	21070	87488	51789	314
1027	Schoharie Cr. Below Cobleskill Cr.	12661	26334	173316	131666	805
1028	Schoharie Cr. at Burtonsville, USGS 3515	15359	26797	180196	149922	883
1029	Mohawk R. below Schoharie Cr.	54800	64118	293924	379254	3114
1030	Mohawk R. at Amsterdam, N.Y.	60953	64116	297861	395809	3217
1031	Mohawk R. at Cranesville, N.Y.	62612	64026	297090	397365	324[illegible]
1032	Mohawk R. at Rotterdam Jct., N.Y.	63986	63525	295736	398075	3277
1033	Mohawk R. at Schenectady, N.Y.	65146	63339	293535	396922	3315
1034	Mohawk R. at Vischer Ferry, N.Y.	69566	63320	291113	397577	3423
1035	Mohawk R. at Cohoes, USGS 3575	70486	63291	290206	397659	3456



CRESCENT DAM

DISCHARGE - FREQUENCY CURVE

```
1***********************************
 * FLOOD FLOW FREQUENCY ANALYSIS *
 * PRELIMINARY ------- JUNE 1976 *
 ***********************************
0
0**TITLE CARD(S)**
 TT        MOHAWK RIVER AT COHOES, N.Y.
 TT        1918-1975
 TT        D.A.= 3456 SQ. MI.
0**JOB CARD(S)**
      IPPC   ISKFX  IPROUT    IFMT    IWYR   IUNIT
 J1     2      1      0         1       0      1
0**STATION IDENTIFICATION**
 ID    01357500 MOHAWK RIVER AT COHOES, N.Y.
0**GENERALIZED SKEW**
 GS         .70
0**SYSTEMATIC FLOOD PEAKS**
 QR     58 QR CARDS SUPPLIED
0**END OF INPUT DATA**
 ED ***************************************************************
 ******************************************************************
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PRELIMINARY RESULTS

-ANNUAL PEAKS - 01357500 MOHAWK RIVER AT COHOES, N.Y.

DATA ANALYZED				ORDERED DATA			
MON	DAY	YEAR	FLOW	RANK	WATER YEAR	FLOW	MEDIAN PLOT POS
0	0	1918	45400.	1	1964	143000.	.0120
0	0	1919	35000.	2	1936	130000.	.0291
0	0	1920	64500.	3	1938	102000.	.0462
0	0	1921	47100.	4	1956	100000.	.0634
0	0	1922	56400.	5	1949	86300.	.0805
0	0	1923	58300.	6	1960	83300.	.0976
0	0	1924	71500.	7	1948	82700.	.1147
0	0	1925	57500.	8	1974	80900.	.1318
0	0	1926	52600.	9	1951	77300.	.1490
0	0	1927	54800.	10	1975	74200.	.1661
0	0	1928	54800.	11	1950	72800.	.1832
0	0	1929	72000.	12	1929	72000.	.2003
0	0	1930	38500.	13	1961	71900.	.2175
0	0	1931	33000.	14	1924	71500.	.2346
0	0	1932	41000.	15	1920	64500.	.2517
0	0	1933	47600.	16	1959	64400.	.2688
0	0	1934	45200.	17	1943	63900.	.2860
0	0	1935	61100.	18	1940	63000.	.3031
0	0	1936	130000.	19	1962	61900.	.3202
0	0	1937	48900.	20	1963	61600.	.3373
0	0	1938	102000.	21	1935	61100.	.3545
0	0	1939	51000.	22	1952	60800.	.3716
0	0	1940	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*	0	0	1941	49100.	*	24	1946	58300.	.4058
*	0	0	1942	47200.	*	25	1923	58300.	.4229
*	0	0	1943	63900.	*	26	1972	58100.	.4401
*	0	0	1944	46000.	*	27	1925	57500.	.4572
*	0	0	1945	47500.	*	28	1954	56800.	.4743
*	0	0	1946	58300.	*	29	1922	56400.	.4914
*	0	0	1947	51300.	*	30	1970	56400.	.5086
*	0	0	1948	82700.	*	31	1968	55800.	.5257
*	0	0	1949	86300.	*	32	1973	55800.	.5428
*	0	0	1950	72800.	*	33	1928	54800.	.5599
*	0	0	1951	77300.	*	34	1927	54800.	.5771
*	0	0	1952	60800.	*	35	1926	52600.	.5942
*	0	0	1953	59000.	*	36	1955	51500.	.6113
*	0	0	1954	56800.	*	37	1947	51300.	.6284
*	0	0	1955	51500.	*	38	1939	51000.	.6455
*	0	0	1956	100000.	*	39	1941	49100.	.6627
*	0	0	1957	23000.	*	40	1937	48900.	.6798
*	0	0	1958	39700.	*	41	1933	47600.	.6969
*	0	0	1959	64400.	*	42	1945	47500.	.7140
*	0	0	1960	83300.	*	43	1942	47200.	.7312
*	0	0	1961	71900.	*	44	1921	47100.	.7483
*	0	0	1962	61900.	*	45	1944	46000.	.7654
*	0	0	1963	61600.	*	46	1918	45400.	.7825
*	0	0	1964	143000.	*	47	1934	45200.	.7997
*	0	0	1965	27800.	*	48	1969	42300.	.8168
*	0	0	1966	32700.	*	49	1932	41000.	.8339
*	0	0	1967	24600.	*	50	1971	40600.	.8510
*	0	0	1968	55800.	*	51	1958	39700.	.8682
*	0	0	1969	42300.	*	52	1930	38500.	.8853
*	0	0	1970	56400.	*	53	1919	35000.	.9024
*	0	0	1971	40600.	*	54	1931	33000.	.9195
*	0	0	1972	58100.	*	55	1966	32700.	.9366
*	0	0	1973	55800.	*	56	1965	27800.	.9538
*	0	0	1974	80400.	*	57	1967	24600.	.9709
*	0	0	1975	74200.	*	58	1957	23000.	.9880

PRELIMINARY RESULTS

-FREQUENCY CURVE- 01357500 MOHAWK RIVER AT COHOES, N.Y.

........PEAK FLOWS........		EXCEEDANCE	...CONFIDENCE LI…	
COMPUTED	EXPECTED PROBABILITY	PROBABILITY	.05 LIMIT	.95 LI…
182000.	196000.	.002	230000.	153000.
157000.	166000.	.005	193000.	135000.
140000.	146000.	.010	169000.	121000.
124000.	127000.	.020	146000.	[illegible]
108000.	110000.	.040	125000.	[illegible]
88600.	89600.	.100	99700.	[illegible]
74300.	74700.	.200	81800.	[illegible]
56500.	56500.	.500	58800.	[illegible]

```
*     41300.      41100.   *      .800     *     44900.      37400.   *
*     36200.      35900.   *      .900     *     39700.      32300.   *
*     32600.      32300.   *      .950     *     36100.      28700.   *
*     27300.      26700.   *      .990     *     30800.      23400.   *
**************************************************************************
*    FREQUENCY CURVE STATISTICS       *      STATISTICS BASED ON         *
**************************************************************************
*   MEAN LOGARITHM          4.7464    *    SYSTEMATIC DATA        58    *
*   STANDARD DEVIATION       .1528    *    HISTORIC EVENTS         0    *
*   COMPUTED SKEW            .0256    *    HIGH OUTLIERS           0    *
*   GENERALIZED SKEW         .7000    *    LOW OUTLIERS            0    *
*   ADOPTED SKEW             .4000    *    ZERO OR MISSING         0    *
*                                     *    TOTAL PERIOD,YEARS     58    *
**************************************************************************


 PRELIMINARY RESULTS
-FREQUENCY PLOT - 01357500 MOHAWK RIVER AT COHOES, N.Y.
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND
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          .      .      .       .           X             .        .
          .      .      .       .   X O  O  .             .        .
          .      .      X       .  O        .             .        .
          .      .      .       O           .             .        .
          .      .      . O     .           .             .        .
  20000-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
       .999   .997    .99      .97         .90           .70      .50
                                                              EXCEEDANCE PR

      LEGEND - O=OBSERVED VALUE, H=HIGH OUTLIER OR HISTORIC VALUE, L=L(
R


 FINAL RESULTS
-ANNUAL PEAKS    - 01357500 MOHAWK RIVER AT COHOES, N.Y.
**************************************************************************
*......DATA ANALYZED.......*.........       ORDERED DATA               *
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MON	DAY	YEAR	FLOW	RANK	WATER YEAR	FLOW	MEDIAN PLOT POS
0	0	1918	45400.	1	1964	143000.	.0120
0	0	1919	35000.	2	1936	130000.	.0291
0	0	1920	64500.	3	1938	102000.	.0462
0	0	1921	47100.	4	1956	100000.	.0634
0	0	1922	56400.	5	1949	86300.	.0805
0	0	1923	58300.	6	1960	83300.	.0976
0	0	1924	71500.	7	1948	82700.	.1147
0	0	1925	57500.	8	1974	80900.	.1318
0	0	1926	52600.	9	1951	77300.	.1490
0	0	1927	54800.	10	1975	74200.	.1661
0	0	1928	54800.	11	1950	72800.	.1832
0	0	1929	72000.	12	1929	72000.	.2003
0	0	1930	38500.	13	1961	71900.	.2175
0	0	1931	33000.	14	1924	71500.	.2346
0	0	1932	41000.	15	1920	64500.	.2517
0	0	1933	47600.	16	1959	64400.	.2688
0	0	1934	45200.	17	1943	63900.	.2860
0	0	1935	61100.	18	1940	63000.	.3031
0	0	1936	130000.	19	1962	61900.	.3202
0	0	1937	48900.	20	1963	61600.	.3373
0	0	1938	102000.	21	1935	61100.	.3545
0	0	1939	51000.	22	1952	60800.	.3716
0	0	1940	63000.	23	1953	59000.	.3887
0	0	1941	49100.	24	1946	58300.	.4058
0	0	1942	47200.	25	1923	58300.	.4229
0	0	1943	63900.	26	1972	58100.	.4401
0	0	1944	46000.	27	1925	57500.	.4572
0	0	1945	47500.	28	1954	56800.	.4743
0	0	1946	58300.	29	1922	56400.	.4914
0	0	1947	51300.	30	1970	56400.	.5086
0	0	1948	82700.	31	1968	55800.	.5257
0	0	1949	86300.	32	1973	55800.	.5428
0	0	1950	72800.	33	1928	54800.	.5599
0	0	1951	77300.	34	1927	54800.	.5771
0	0	1952	60800.	35	1926	52600.	.5942
0	0	1953	59000.	36	1955	51500.	.6113
0	0	1954	56800.	37	1947	51300.	.6284
0	0	1955	51500.	38	1939	51000.	.6455
0	0	1956	100000.	39	1941	49100.	.6627
0	0	1957	23000.	40	1937	48900.	.6798
0	0	1958	39700.	41	1933	47600.	.6969
0	0	1959	64400.	42	1945	47500.	.7140
0	0	1960	83300.	43	1942	47200.	.7312
0	0	1961	71900.	44	1921	47100.	.7483
0	0	1962	61900.	45	1944	46000.	.7654
0	0	1963	61600.	46	1918	45400.	.7825
0	0	1964	143000.	47	1934	45200.	.7997
0	0	1965	27800.	48	1969	42300.	.8168
0	0	1966	32700.	49	1932	41000.	.8339
0	0	1967	24600.	50	1971	40600.	.8510
0	0	1968	55800.	51	1958	39700.	.8682

AD-A077 424 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. CRESCENT DAM (INVENTORY NUMBER NY --ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

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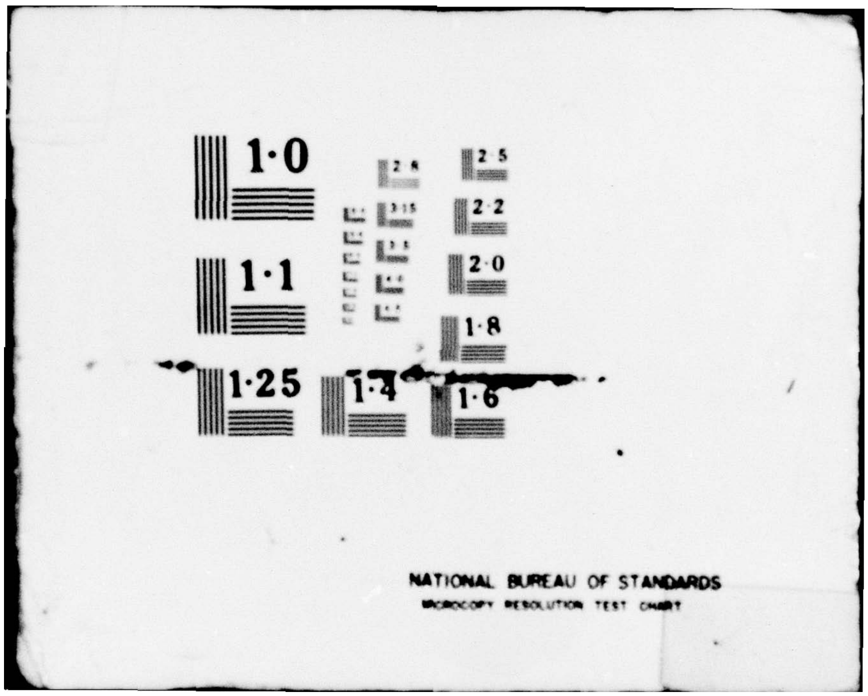
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

0	0	1969	42300.		52	1930	38500.	.8853
0	0	1970	56400.		53	1919	35000.	.9024
0	0	1971	40600.		54	1931	33000.	.9195
0	0	1972	58100.		55	1966	32700.	.9366
0	0	1973	55800.		56	1965	27800.	.9538
0	0	1974	80900.		57	1967	24600.	.9709
0	0	1975	74200.		58	1957	23000.	.9880

1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 23470.4

FINAL RESULTS
-FREQUENCY CURVE- 01357500 MOHAWK RIVER AT COHOES, N.Y.

PEAK FLOWS COMPUTED	PEAK FLOWS EXPECTED PROBABILITY	EXCEEDANCE PROBABILITY	CONFIDENCE LIMITS .05 LIMIT	CONFIDENCE LIMITS .95 LIMIT
181000.	196000.	.002	227000.	153000.
156000.	165000.	.005	191000.	134000.
139000.	145000.	.010	166000.	121000.
122000.	126000.	.020	144000.	108000.
107000.	109000.	.040	123000.	95900.
87900.	88800.	.100	98200.	80300.
73900.	74200.	.200	80900.	66400.
54700.	54700.	.500	58800.	50800.
41800.	41800.	.800	45300.	38000.
36600.	36500.	.900	40100.	32800.
32800.	32500.	.950	36300.	28900.
0.	0.	.990	0.	0.

FREQUENCY CURVE STATISTICS		STATISTICS BASED ON	
MEAN LOGARITHM	4.7531	SYSTEMATIC DATA	57
STANDARD DEVIATION	.1452	HISTORIC EVENTS	0
COMPUTED SKEW	.2299	HIGH OUTLIERS	0
GENERALIZED SKEW	.7000	LOW OUTLIERS	1
ADOPTED SKEW	.5000	ZERO OR MISSING	0
		TOTAL PERIOD,YEARS	58

FINAL RESULTS
-FREQUENCY PLOT - 01357500 MOHAWK RIVER AT COHOES, N.Y.
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND
0
200000

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1*************************************
 * FLOOD FLOW FREQUENCY ANALYSIS *
 * PRELIMINARY ------- JUNE 1976 *
 *************************************
0
***TITLE CARD(S)***
 TT       MOHAWK RIVER AT COHOES, N.Y.
 TT       1918-1975
 TT       D.A.= 3456 SQ. MI.
***JOB CARD(S)***
      IPPC   ISKEW  IPROUT    IPNT    IMYR   IUNIT
 J1     2       1       0       1       0       1
***STATION IDENTIFICATION***
 ID   01357500 MOHAWK RIVER AT COHOES, N.Y.
***GENERALIZED SKEW***
 GS          .70
***SYSTEMATIC FLOOD PEAKS***
 QW    58 QW CARDS SUPPLIED
***END OF INPUT DATA***
 ED ****************************************************
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PRELIMINARY RESULTS
*ANNUAL PEAKS * 01357500 MOHAWK RIVER AT COHOES, N.Y.

DATA ANALYZED				ORDERED DATA			
MON DAY		YEAR	FLOW	RANK	WATER YEAR	FLOW	MEDIAN PLOT-POS
0	0	1918	65400.	1	1964	143000.	.0120
0	0	1919	35000.	2	1936	130000.	.0291
0	0	1920	64500.	3	1938	102000.	.0462
0	0	1921	47100.	4	1956	100000.	.0634
0	0	1922	56400.	5	1949	86300.	.0805
0	0	1923	58300.	6	1960	83300.	.0976
0	0	1924	71500.	7	1948	82700.	.1147
0	0	1925	57500.	8	1974	80900.	.1318
0	0	1926	52900.	9	1951	77300.	.1490
0	0	1927	54900.	10	1975	74200.	.1661
0	0	1928	54930.	11	1950	72800.	.1832
0	0	1929	72000.	12	1929	72000.	.2003
0	0	1930	30500.	13	1961	71900.	.2175
0	0	1931	33000.	14	1924	71500.	.2346
0	0	1932	41000.	15	1920	64500.	.2517
0	0	1933	47000.	16	1959	64400.	.2688
0	0	1934	65200.	17	1943	63900.	.2860
0	0	1935	61100.	18	1946	63000.	.3031
0	0	1936	130000.	19	1962	61900.	.3202
0	0	1937	48900.	20	1963	61000.	.3373
0	0	1938	102000.	21	1935	61100.	.3545
0	0	1939	51000.	22	1952	60000.	.3716
0	0	1940	63000.	23	1953	59000.	.3887

M8

0	0	1941	49100.	24	1946	58300.	.4058
0	0	1942	47200.	25	1923	58300.	.4229
0	0	1943	63900.	26	1972	58100.	.4401
0	0	1944	46000.	27	1925	57500.	.4572
0	0	1945	47500.	28	1954	56900.	.4743
0	0	1946	58300.	29	1922	56600.	.4914
0	0	1947	51300.	30	1970	56400.	.5086
0	0	1948	62700.	31	1968	55900.	.5257
0	0	1949	80300.	32	1973	55800.	.5428
0	0	1950	72000.	33	1920	54600.	.5599
0	0	1951	77300.	34	1927	54400.	.5771
0	0	1952	60000.	35	1926	52000.	.5942
0	0	1953	59000.	36	1955	51500.	.6113
0	0	1954	56900.	37	1947	51300.	.6284
0	0	1955	51500.	38	1939	51000.	.6455
0	0	1956	100000.	39	1941	49100.	.6627
0	0	1957	23000.	40	1937	48900.	.6798
0	0	1958	39700.	41	1933	47600.	.6969
0	0	1959	66600.	42	1945	47500.	.7140
0	0	1960	63300.	43	1942	47200.	.7312
0	0	1961	71900.	44	1921	47100.	.7483
0	0	1962	61900.	45	1944	46000.	.7654
0	0	1963	61600.	46	1918	45400.	.7825
0	0	1964	103000.	47	1934	45200.	.7997
0	0	1965	27800.	48	1969	42300.	.8168
0	0	1966	32700.	49	1932	41000.	.8339
0	0	1967	24000.	50	1971	40800.	.8510
0	0	1968	55900.	51	1958	39700.	.8682
0	0	1969	42300.	52	1930	38500.	.8853
0	0	1970	56400.	53	1919	35000.	.9024
0	0	1971	40800.	54	1931	33000.	.9195
0	0	1972	58100.	55	1966	32700.	.9366
0	0	1973	55800.	56	1965	27800.	.9538
0	0	1974	80900.	57	1967	24000.	.9709
0	0	1975	74200.	58	1957	23000.	.9880

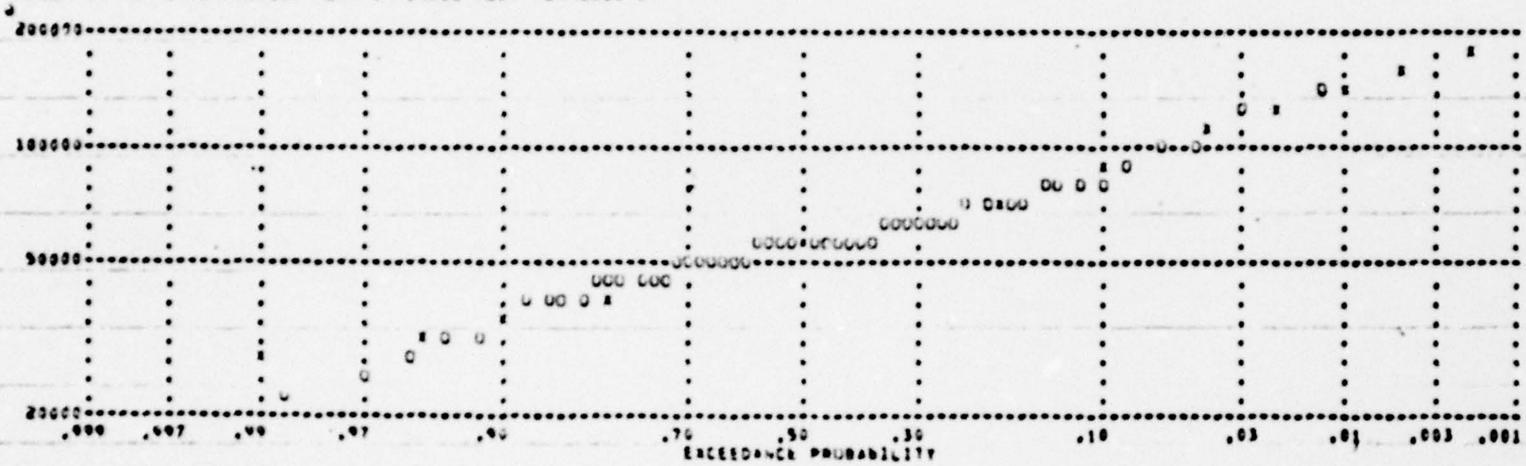
PRELIMINARY RESULTS
FREQUENCY CURVE 01357500 MOHAWK RIVER AT COHOES, N.Y.

PEAK FLOWS COMPUTED	PEAK FLOWS EXPECTED PROBABILITY	EXCEEDANCE PROBABILITY	CONFIDENCE LIMITS .05 LIMIT	CONFIDENCE LIMITS .95 LIMIT
182000.	190000.	.002	230000.	153000.
157000.	169000.	.005	193000.	135000.
140000.	146000.	.010	169000.	121000.
124000.	127000.	.020	148000.	109000.
106000.	110000.	.040	125000.	96500.
88000.	89000.	.100	99700.	80000.
76300.	76700.	.200	81900.	68500.
56500.	56500.	.500	58800.	56000.

41300.	41100.	.800	44900.	37400.
34400.	35900.	.900	39700.	32300.
32000.	32300.	.950	36100.	28700.
27300.	26700.	.990	33000.	25400.

FREQUENCY CURVE STATISTICS		STATISTICS BASED ON	
MEAN LOGARITHM	4.7404	SYSTEMATIC DATA	50
STANDARD DEVIATION	.1520	HISTORIC EVENTS	0
COMPUTED SKEW	.0250	HIGH OUTLIERS	0
GENERALIZED SKEW	.7000	LOW OUTLIERS	0
ADOPTED SKEW	.4000	ZERO OR MISSING	0
		TOTAL PERIOD,YEARS	50

PRELIMINARY RESULTS
FREQUENCY PLOT - 01357500 MOHAWK RIVER AT COHOES, N.Y.
BASED ON COMPUTED VALUES. FLOW IN CUBIC FEET PER SECOND



LEGEND - O=OBSERVED VALUE, H=HIGH OUTLIER OR HISTORIC VALUE, L=LOW OUTLIER, *=COMPUTED CURVE

FINAL RESULTS
ANNUAL PEAKS - 01357500 MOHAWK RIVER AT COHOES, N.Y.

DATA ANALYZED	ORDERED DATA

MB

MON	DAY	YEAR	FLOW	RANK	WATER YEAR	FLOW	MEDIAN PLOT POS
0	0	1918	45400.	1	1964	143000.	.0120
0	0	1919	35000.	2	1936	130000.	.0291
0	0	1920	64500.	3	1938	102000.	.0462
0	0	1921	47100.	4	1956	100000.	.0634
0	0	1922	56400.	5	1949	86300.	.0805
0	0	1923	58300.	6	1983	83300.	.0976
0	0	1924	71500.	7	1948	82700.	.1147
0	0	1925	57500.	8	1976	80900.	.1318
0	0	1926	52000.	9	1951	77300.	.1490
0	0	1927	54900.	10	1975	74200.	.1661
0	0	1928	54800.	11	1950	72800.	.1832
0	0	1929	72000.	12	1929	72000.	.2003
0	0	1930	30500.	13	1961	71900.	.2175
0	0	1931	33000.	14	1924	71500.	.2346
0	0	1932	41000.	15	1920	64500.	.2517
0	0	1933	47600.	16	1959	64400.	.2688
0	0	1934	45200.	17	1943	63900.	.2860
0	0	1935	61100.	18	1940	63000.	.3031
0	0	1936	130000.	19	1962	61900.	.3202
0	0	1937	48900.	20	1963	61600.	.3373
0	0	1938	102000.	21	1935	61100.	.3545
0	0	1939	51000.	22	1952	60800.	.3716
0	0	1940	63000.	23	1953	59000.	.3887
0	0	1941	49100.	24	1946	58300.	.4058
0	0	1942	47200.	25	1923	58300.	.4229
0	0	1943	63900.	26	1972	58100.	.4401
0	0	1944	46000.	27	1925	57500.	.4572
0	0	1945	47500.	28	1954	56800.	.4743
0	0	1946	58300.	29	1922	56400.	.4914
0	0	1947	51300.	30	1970	56400.	.5086
0	0	1948	82700.	31	1968	55900.	.5257
0	0	1949	86300.	32	1973	55800.	.5428
0	0	1950	72800.	33	1928	54800.	.5599
0	0	1951	77300.	34	1927	54900.	.5771
0	0	1952	60800.	35	1926	52000.	.5942
0	0	1953	59000.	36	1955	51500.	.6113
0	0	1954	56800.	37	1947	51300.	.6284
0	0	1955	51500.	38	1939	51000.	.6455
0	0	1956	100000.	39	1941	49100.	.6627
0	0	1957	23000.	40	1937	48900.	.6798
0	0	1958	39700.	41	1933	47600.	.6969
0	0	1959	64400.	42	1945	47500.	.7140
0	0	1960	43300.	43	1942	47200.	.7312
0	0	1961	71900.	44	1921	47100.	.7483
0	0	1962	61900.	45	1944	46000.	.7654
0	0	1963	61600.	46	1918	45400.	.7825
0	0	1964	143000.	47	1934	45200.	.7997
0	0	1965	27900.	48	1960	42300.	.8168
0	0	1966	32700.	49	1932	41000.	.8339
0	0	1967	20000.	50	1971	40000.	.8510
0	0	1968	55900.	51	1958	39700.	.8682

0	0	1969	62330.	•	52	1939	30500.	.8853	
0	0	1970	56400.	•	53	1919	35000.	.9024	
0	0	1971	60000.	•	54	1931	33000.	.9195	
0	0	1972	58130.	•	55	1966	32700.	.9366	
0	0	1973	55000.	•	56	1965	27000.	.9538	
0	0	1974	88900.	•	57	1967	26000.	.9709	
0	0	1975	74230.	•	58	1957	23000.	.9880	

1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 23670.6

FINAL RESULTS
FREQUENCY CURVE 01357500 MOHAWK RIVER AT COHOES, N.Y.

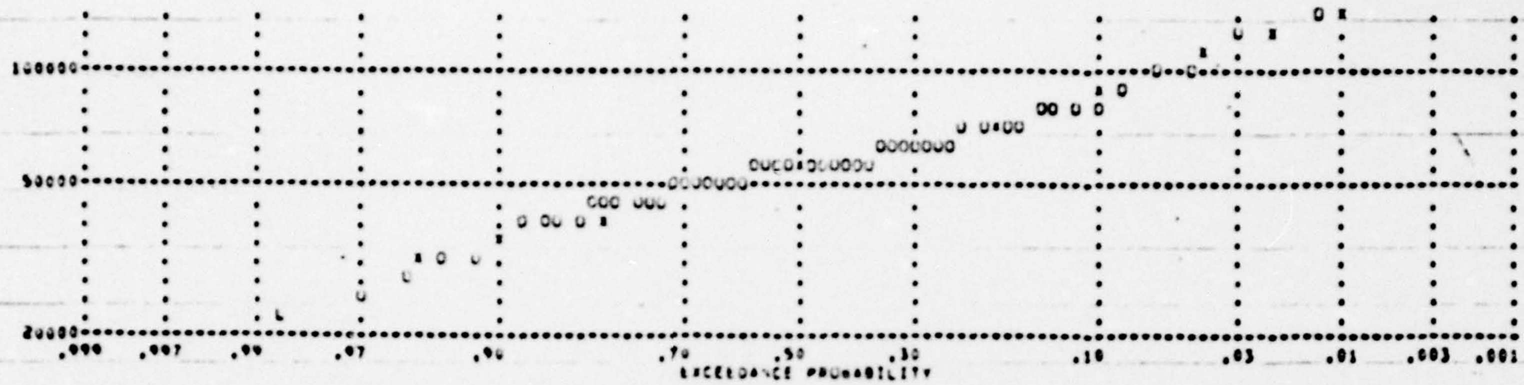
........PEAK FLOWS........		EXCEEDANCE	...CONFIDENCE LIMITS...	
COMPUTED	EXPECTED PROBABILITY	PROBABILITY	.05 LIMIT	.95 LIMIT
191000.	196000.	.002	227000.	153000.
150000.	165000.	.005	191000.	134000.
139000.	145000.	.010	166000.	121000.
122000.	126000.	.020	144000.	108000.
107000.	109000.	.040	123000.	95900.
87900.	88900.	.100	98200.	80300.
73900.	74200.	.200	83900.	66400.
56700.	56700.	.500	58900.	50600.
41000.	41000.	.800	45300.	36000.
36000.	36500.	.900	40100.	32000.
32000.	32500.	.950	36300.	28900.
0.	0.	.990	0.	0.

FREQUENCY CURVE STATISTICS		STATISTICS BASED ON	
MEAN LOGARITHM	4.7531	SYSTEMATIC DATA	57
STANDARD DEVIATION	.1052	HISTORIC EVENTS	0
COMPUTED SKEW	.2299	HIGH OUTLIERS	0
GENERALIZED SKEW	.7000	LOW OUTLIERS	1
ADOPTED SKEW	.5000	ZERO OR MISSING	0
		TOTAL PERIOD,YEARS	58

m/sgi. = 4.75 − .75 log 3456 = 2.10
2.65

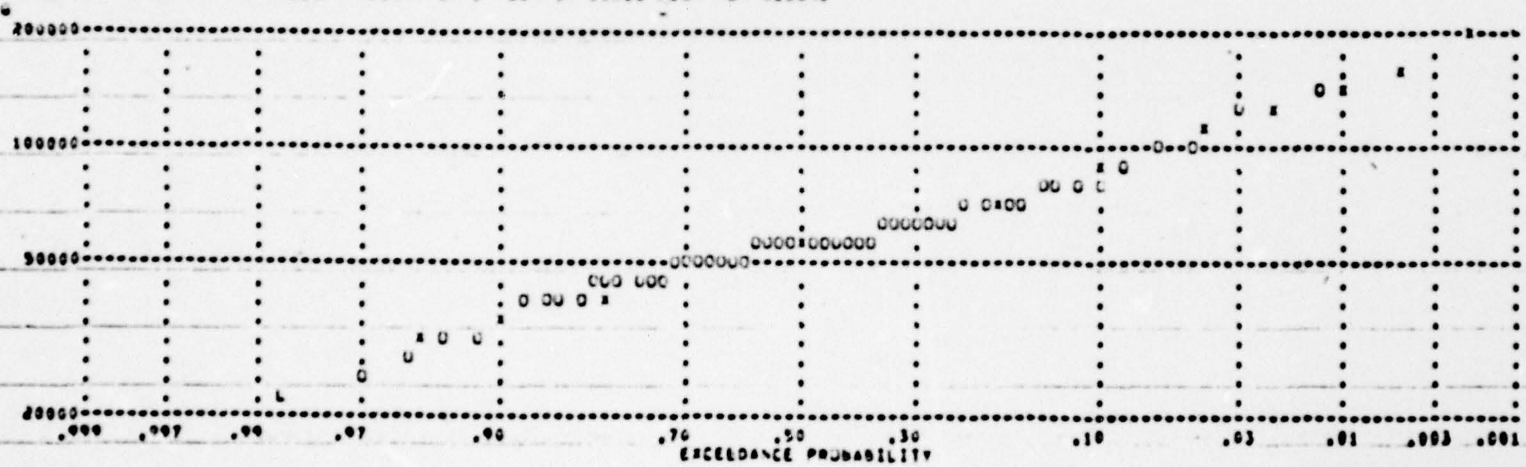
FINAL RESULTS
FREQUENCY PLOT 01357500 MOHAWK RIVER AT COHOES, N.Y.
BASED ON COMPUTED VALUES, FLOW IN CUBIC FEET PER SECOND
0
200000

MB



LEGEND = O=OBSERVED VALUE, H=HIGH OUTLIER OR HISTORIC VALUE, L=LOW OUTLIER, X=COMPUTED CURVE

FINAL RESULTS
FREQUENCY PLOT - 01357500 MOHAWK RIVER AT COHOES, N.Y.
BASED ON EXPECTED PROBABILITY ADJUSTMENT, FLOW IN CUBIC FEET PER SECOND



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(0039)  K1       7 SUB AREA-3 RUNOFF
(0040)  M      1       0     269       0    3456       0       0       0       1
(0041)  P      0    21.9    37.5    52.0    62.5    73.5    79.0
(0042)  T   .125     2.0     1.0
(0043)  W  17.65    8.19
(0044)  X    540    4100     1.3
(0045)  K      2    1003       0       0       0       0       1
(0046)  K1       8 COMBINE 2 HYDROGRAPHS FOR MOHAWK RIVER AT ORISKANY
(0047)  K      1    1004       0       0       0       0       1
(0048)  K1       9 CHANNEL ROUTE - MOHAWK RIVER TO UTICA
(0049)  Y      0       0       0       0       1
(0050)  Y1     1       0       0       2      .2
(0051)  K      0       4       0       0       0       0       1
(0052)  K1      10 SUB AREA-4 RUNOFF
(0053)  M      1       0      93       0    3456       0       0       0       1
(0054)  P      0    21.9    37.5    52.0    62.5    73.5    79.0
(0055)  T   .125     2.0     1.0
(0056)  W  13.44    6.98
(0057)  X    140    1100     1.3
(0058)  K      2    1004       0       0       0       0       1
(0059)  K1      11 COMBINE 2 HYDROGRAPHS FROM MOHAWK RIVER AT UTICA
(0060)  K      1    1005       0       0       0       0       1
(0061)  K1      12 CHANNEL ROUTE - MOHAWK RIVER TO ILION
(0062)  Y      0       0       0       0       1
(0063)  Y1     2       0       0    2.45      .2
(0064)  K      0       5       0       0       0       0       1
(0065)  K1      13 SUB AREA-5 RUNOFF
(0066)  M      1       0     158    3456       0       0       0       0       1
(0067)  P      0    21.9    37.5    52.0    62.5    73.5    79.0
(0068)  T    .10    2.00     1.0
(0069)  W  15.69    8.17
(0070)  X    265    2100     1.3
(0071)  K      2    1005       0       0       0       0       1
(0072)  K1      14 COMBINE 2 HYDROGRAPHS FOR MOHAWK RIVER AT ILION
(0073)  K      1    1010       0       0       0       0       1
(0074)  K1      15 CHANNEL ROUTE - MOHAWK RIVER BELOW W. CANADA CREEK
(0075)  Y      0       0       0       0       1
(0076)  Y1     1       0       0     1.5      .2
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(0077)  K       0       6       0       0       0       0       1
(0078)  K1        16 SUB AREA-6 RUNOFF
(0079)  M       1       0     375       0    3456       0       0       0       1
(0080)  P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0081)  T    .075     1.0     1.0
(0082)  W   22.55   15.88
(0083)  X     725    5700     1.3
(0084)  K       1    1006       0       0       0       0       1
(0085)  K1        17 CHANNEL ROUTE - W. CANADA CREEK BELOW HINCKLEY RESERVOIR (USGS 3440)
(0086)  Y       0       0       0       1       1
(0087)  Y1      1       0       0       0       0       0  157900
(0088)  Y2  53170   86400  129710  157900  161100  164540  167750  170960  174400  190670
(0089)  Y3      0       0       0       0     474    1340    2462    3790    5297   14962
(0090)  K       0       7       0       0       0       0       1
(0091)  K1        18 SUB AREA-7 RUNOFF
(0092)  M       1       0       7       0    3456       0       0       0       1
(0093)  P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0094)  T    .075     1.0     1.0
(0095)  W    7.12    4.91
(0096)  X       7      50     1.3
(0097)  K       2    1007       0       0       0       0       1
(0098)  K1        19 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK AT TRENTON
(0099)  K       0       8       0       0       0       0       1
(0100)  K1        20 SUB AREA-8 RUNOFF
(0101)  M       1       0      53       0    3456       0       0       0       1
(0102)  P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0103)  T    .075     1.0     1.0
(0104)  W   11.42    6.25
(0105)  X      72     550     1.3
(0106)  K       2    1008       0       0       0       0       1
(0107)  K1        21 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK BELOW CINNCINNATI CREEK
(0108)  K       1    1009       0       0       0       0       1
(0109)  K1        22 CHANNEL ROUTE - W. CANADA CREEK TO KAST BRIDGE (USGS 3460)
(0110)  Y       0       0       0       0       1
(0111)  Y1      4       0       0    1.08      .3
(0112)  K       0       9       0       0       0       0       1
(0113)  K1        23 SUB AREA-9 RUNOFF
(0114)  M       1       0     121       0    3456       0       0       0       1
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(0115)   P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0116)   T    .075     1.0     1.0
(0117)   V   14.17     7.0
(0118)   X     190    1450     1.3
(0119)   K       2    1009       0       0       0       0       1
(0120)   K1        24 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK AT KAST BRIDGE (USGS 3460)
(0121)   K       1    1010       0       0       0       0       1
(0122)   K1        25 CHANNEL ROUTE - W. CANADA CREEK TO MOHAWK RIVER
(0123)   Y       0       0       0       0       1
(0124)   Y1      1       0       0    0.72      .3
(0125)   K       0      10       0       0       0       0       1
(0126)   K1        26 SUB AREA-10 RUNOFF
(0127)   M       1       0      45       0    3456       0       0       0       1
(0128)   P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0129)   T    .075     2.0     1.0
(0130)   V   11.33    6.41
(0131)   X      60     500     1.3
(0132)   K       3    1010       0       0       0       0       1
(0133)   K1        27 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW W. CANADA CREEK
(0134)   K       1    1011       0       0       0       0       1
(0135)   K1        28 CHANNEL ROUTE - MOHAWK RIVER AT LITTLE FALLS
(0136)   Y       0       0       0       0       1
(0137)   Y1      1       0       0     2.1      .2
(0138)   K       0      11       0       0       0       0       1
(0139)   K1        29 SUB AREA-11 RUNOFF
(0140)   M       1       0      27       0    3456       0       0       0       1
(0141)   P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0142)   T    .075     1.0     1.0
(0143)   V    9.63    5.63
(0144)   X      32     280     1.3
(0145)   K       2    1011       0       0       0       0       1
(0146)   K1        30 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER IN LITTLE FALLS
(0147)   K       1    1012       0       0       0       0       1
(0148)   K1        31 CHANNEL ROUTE - MOHAWK RIVER AT LITTLE FALLS (USGS 3470)
(0149)   Y       0       0       0       0       1
(0150)   Y1      1       0       0     1.7      .2
(0151)   K       0      12       0       0       0       0       1
(0152)   K1        32 SUB AREA-12 RUNOFF
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(0153)  M      1      0     23      0   3456      0      0      0      1
(0154)  P      0   21.9   37.5   52.0   62.5   73.5   79.0
(0155)  T   .075    1.0    1.0
(0156)  V   9.44   5.54
(0157)  X     27    250    1.3
(0158)  K      2   1012      0      0      0      0      1
(0159)  K1       33 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER IN LITTLE FALLS (USGS 3470)
(0160)  K      1   1015      0      0      0      0      1
(0161)  K1       34 CHANNEL ROUTE - MOHAWK RIVER BELOW E. CANADA CREEK
(0162)  Y      0      0      0      0      1
(0163)  Y1     1      0      0     .5     .2
(0164)  K      0     13      0      0      0      0      1
(0165)  K1       35 SUB AREA-13 RUNOFF
(0166)  M      1      0    261      0   3456      0      0      0      1
(0167)  P      0   29.1   37.5   52.0   62.5   73.5   79.0
(0168)  T   .075    1.0    1.0
(0169)  V  17.09   7.88
(0170)  X    480   3650    1.3
(0171)  K      0     14      0      0      0      0      1
(0172)  K1       36 SUB AREA-14 RUNOFF
(0173)  M      1      0     30      0   3456      0      0      0      1
(0174)  P      0   21.9   37.5   52.0   62.5   73.5   79.0
(0175)  T   .075    1.0    1.0
(0176)  V  10.04   5.64
(0177)  X     37    320    1.3
(0178)  K      2   1014      0      0      0      0      1
(0179)  K1       37 COMBINE 2 HYDROGRAPHS AT E. CANADA CREEK AT EAST CREEK (USGS 3480)
(0180)  K      1   1014      0      0      0      0      1
(0181)  K1       38 CHANNEL ROUTE - E. CANADA CREEK TO EAST CREEK (USGS 3480)
(0182)  Y      0      0      0      0      1
(0183)  Y1     1      0      0     14      0
(0184)  K      1   1015      0      0      0      0      1
(0185)  K1       39 CHANNEL ROUTE - MOHAWK RIVER BELOW E. CANADA CREEK
(0186)  Y      0      0      0      0      1
(0187)  Y1     1      0      0    1.0     .2
(0188)  K      0     15      0      0      0      0      1
(0189)  K1       40 SUB AREA-15 RUNOFF
(0190)  M      1      0     37      0   3456      0      0      0      1
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(0191)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0192)  T     .075     1.0     1.0
(0193)  W    10.48    5.86
(0194)  X       44     400     1.3
(0195)  K        3    1015       0       0       0       0       1
(0196)  K1        41 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW E. CANADA CREEK
(0197)  K        1    1016       0       0       0       0       1
(0198)  K1        42 CHANNEL ROUTE - MOHAWK RIVER BELOW CAROGA CREEK
(0199)  Y        0       0       0       0       1
(0200)  Y1       1       0       0     2.5      .2
(0201)  K        0      16       0       0       0       0       1
(0202)  K1        43 SUB AREA-16 RUNOFF
(0203)  M        1       0     151       0    3456       0       0       0       1
(0204)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0205)  T     .075     1.0     1.0
(0206)  W    18.56   17.91
(0207)  X      250    3500     1.3
(0208)  K        2    1016       0       0       0       0       1
(0209)  K1        44 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER BELOW CAROGA CREEK
(0210)  K        1    1018       0       0       0       0       1
(0211)  K1        45 CHANNEL ROUTE - MOHAWK RIVER BELOW OTSQUAGO CREEK
(0212)  Y        0       0       0       0       1
(0213)  Y1       1       0       0     1.0      .2
(0214)  K        0      17       0       0       0       0       1
(0215)  K1        46 SUB AREA-17 RUNOFF
(0216)  M        1       0    59.2       0    3456       0       0       0       1
(0217)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0218)  T     .075     1.0     1.0
(0219)  W    11.88    6.26
(0220)  X       52     600     1.3
(0221)  K        0      18       0       0       0       0       1
(0222)  K1        47 SUB-AREA-18 RUNOFF
(0223)  M        1       0    13.1       0    3456       0       0       0       1
(0224)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0225)  T     .075     1.0     1.0
(0226)  W     8.25    5.22
(0227)  X       14     100     1.3
(0228)  K        3    1018       0       0       0       0       1
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(0229)   K1        48 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW OTSQUAGO CREEK
(0230)   K         1    1019       0         0         0         0         1
(0231)   K1        49 CHANNEL ROUTE-MOHAWK RIVER BELOW CANAJOHARIE  CREEK
(0232)   Y         0         0         0         0         1
(0233)   Y1        1         0         0       1.2        .2
(0234)   K         0        19         0         0         0         0         1
(0235)   K1        50 SUB AREA - 19 RUNOFF
(0236)   M         1         0        72         0      3456         0         0         0         1
(0237)   F         0      21.9      37.5      52.0      62.5      73.5      79.0
(0238)   T      .075       1.0       1.0
(0239)   V     12.44      6.41
(0240)   X       103       700       1.3
(0241)   K         2      1019         0         0         0         0         1
(0242)   K1        51 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER BELOW CANAJOHARIE CREEK
(0243)   K         1      1020         0         0         0         0         1
(0244)   K1        52 CHANNEL ROUTE - MOHAWK RIVER AT SPRAKERS
(0245)   Y         0         0         0         0         1
(0246)   Y1        1         0         0       1.2        .2
(0247)   K         0        20         0         0         0         0         1
(0248)   K1        53 SUB AREA-20 RUNOFF
(0249)   M         1         0        55         0      3456         0         0         0         1
(0250)   F         0      21.9      37.5      52.0      62.5      73.5      79.0
(0251)   T      .075       1.0       1.0
(0252)   V     11.78      6.38
(0253)   X        75       550       1.3
(0254)   K         2      1020         0         0         0         0         1
(0255)   K1        54 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT SPRAKERS
(0256)   K         1      1023         0         0         0         0         1
(0257)   K1        55 CHANNEL ROUTE - MOHAWK RIVER BELOW CAYADUTTA CREEK
(0258)   Y         0         0         0         0         1
(0259)   Y1        2         0         0      1.55        .2
(0260)   K         0        21         0         0         0         0         1
(0261)   K1        56 SUB AREA-21   RUNOFF
(0262)   M         1         0      12.7         0      3456         0         0         0         1
(0263)   F         0      21.9      37.5      52.0      62.5      73.5      79.0
(0264)   T      .075       1.3       1.0
(0265)   V      8.61      6.32
(0266)   X        13       120       1.3
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(0305)   K1          65 SUB AREA-25
(0306)   M       1         0    184.5        0     3465        0        0        0        1
(0307)   P       0      21.5     37.5     52.0     62.5     73.5     79.0
(0308)   T    .075       2.0      1.0
(0309)   V   16.24      8.22
(0310)   X     320      2500      1.3
(0311)   K       2      1025        0        0        0        0        1
(0312)   K1          66 COMBINE HYDROGRAPHS AT BATAVIA KILL AT WINDHAM
(0313)   K       0        26        0        0        0        0        1
(0314)   K1          67 SUB AREA-26
(0315)   M       1         0     10.2        0     3456        0        0        0        1
(0316)   P       0      21.9     37.5     52.0     62.5     73.5     79.0
(0317)   T    .075       1.5      1.0
(0318)   V    7.65      4.73
(0319)   X      10        70      1.3
(0320)   K       2      1026        0        0        0        0        1
(0321)   K1          68 COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK AT PRATTSVILLE (USGS 3500)
(0322)   K       0       127        0        0        0        0        1
(0323)   K1          69 SUB AREA-127   RUNOFF
(0324)   M       1         0       72        0     3456        0        0        0        1
(0325)   P       0      21.9     37.5     52.0     62.5     73.5     79.0
(0326)   T    .075       1.5      1.0
(0327)   V   12.95      6.94
(0328)   X     115       800      1.3
(0329)   K       2     10127        0        0        0        0        1
(0330)   K1          70 COMBINE 2 HYDROGRAPHS AT SCHOHARIE RESERVOIR AT GILBOA DAM
(0331)   K       1     10127        0        0        0        0        1
(0332)   K1          70(A) ROUTE OVER GILBOA DAM
(0333)   Y       0         0        0        1        1
(0334)   Y1      1         0        0        0        0        0    40660
(0335)   Y2  15330     30260    49120    55260    60660    61750    62640    63920    65010    66100
(0336)   Y3      0         0        0        0        0     3480     9890    18160    27960    39080
(0337)   K       1      1027        0        0        0        0        1
(0338)   K1          71 CHANNEL ROUTE - SCHOHARIE CREEK BELOW COBLESKILL CREEK
(0339)   Y       0         0        0        0        1
(0340)   Y1      4         0        0      1.4       .3
(0341)   K       0        27        0        0        0        0        1
(0342)   K1          72 SUB AREA-27   RUNOFF
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(0343)  M     1     0   451     0  3456     0     0     0     1
(0344)  P     0  21.9  37.5  52.0  62.5  73.5  79.0
(0345)  T  .075  1.25  1.00
(0346)  W 20.79  9.27
(0347)  X  1010  6600   1.3
(0348)  K     2  1027     0     0     0     0     1
(0349)  K1      73 COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK BELOW COBLESKILL CREEK
(0350)  K     1  1028     0     0     0     0     1
(0351)  K1      74 CHANNEL ROUTE - SCHOHARIE CREEK AT BURTONSVILLE (USGS 3515)
(0352)  Y     0     0     0     0     1
(0353)  Y1    1     0     0   1.2    .2
(0354)  K     0    22     0     0     0     0     1
(0355)  K1      75 SUB AREA - 28  RUNOFF
(0356)  M     1     0    78     0  3456     0     0     0     1
(0357)  P     0  21.5  37.5  52.0  62.5  73.5  79.0
(0358)  T  .075  1.25   1.0
(0359)  W 12.75   6.59
(0360)  X   115   800   1.3
(0361)  K     2  1028     0     0     0     0     1
(0362)  K1      76 COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK AT BURTONSVILLE (USGS 3515)
(0363)  K     1  1029     0     0     0     0     1
(0364)  K1      77 CHANNEL ROUTE - MOHAWK RIVER BELOW SCHOHARIE CREEK
(0365)  Y     0     0     0     0     1
(0366)  Y1    1     0     0   2.1    .2
(0367)  K     0    29     0     0     0     0     1
(0368)  K1      78 SUB AREA - 29  RUNOFF
(0369)  M     1     0    87     0  3456     0     0     0     1
(0370)  P     0  21.9  37.5  52.0  62.5  73.5  79.0
(0371)  T  .075   1.1   1.0
(0372)  W 13.13   6.75
(0373)  X   152   920   1.3
(0374)  K     3  1029     0     0     0     0     1
(0375)  K1      79 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW SCHOHARIE CREEK
(0376)  K     1  1030     0     0     0     0     1
(0377)  K1      80 CHANNEL ROUTE - MOHAWK RIVER AT AMSTERDAM
(0378)  Y     0     0     0     0     1
(0379)  Y1    1     0     0   2.1    .2
(0380)  K     0    30     0     0     0     0     1
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(0381)  K1       81 SUB AREA-30  RUNOFF
(0382)  M      1       0     163       0    3456       0       0       0       1
(0383)  P      0    21.7    37.5    52.0    62.5    73.5    79.0
(0384)  T   .075     1.0     1.0
(0385)  V  15.61   11.14
(0386)  A    160    1150     1.3
(0387)  K      2    1030       0       0       0       0       1
(0388)  K1       82 COMBINE 2  HYDROGRAPHS AT MOHAWK RIVER AT AMSTERDAM
(0389)  K      1    1031       0       0       0       0       1
(0390)  K1       83 CHANNEL ROUTE - MOHAWK RIVER AT CRANESVILLE
(0391)  Y      0       0       0       0       1
(0392)  Y1     1       0       0     1.3      .2
(0393)  K      0      31       0       0       0       0       1
(0394)  K1       84 SUB AREA-31  RUNOFF
(0395)  M      1       0      26       0    3456       0       0       0       1
(0396)  P      0    21.9    37.5    52.0    62.5    73.5    79.0
(0397)  T   .075     1.0     1.0
(0398)  V   9.93    5.79
(0399)  A     34     100     1.3
(0400)  K      2    1031       0       0       0       0       1
(0401)  K1       85 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT CRANESVILLE
(0402)  K      1    1032       0       0       0       0       1
(0403)  K1       86 CHANNEL ROUTE - MOHAWK RIVER AT ROTTERDAM JUNCTION
(0404)  Y      0       0       0       0       1
(0405)  Y1     1       0       0     2.1      .2
(0406)  K      0      32       0       0       0       0       1
(0407)  K1       87 SUB AREA-32  RUNOFF
(0408)  M      1       0      32       0    3456       0       0       0       1
(0409)  P      0    21.9    37.5    52.0    62.5    73.5    79.0
(0410)  T   .075     1.0     1.0
(0411)  V  11.64   10.14
(0412)  A     40     350     1.3
(0413)  K      2    1032       0       0       0       0       1
(0414)  K1       88 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT ROTTERDAM JUNCTION
(0415)  K      1    1033       0       0       0       0       1
(0416)  K1       89 CHANNEL ROUTE - MOHAWK RIVER AT SCHENECTADY
(0417)  Y      0       0       0       0       1
(0418)  Y1     2       0       0     1.5      .2
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(0001)   A1       MOHAWK RIVER BASIN
(0002)   A2       HEC-1DB
(0003)   A3       HYDROLOGIC MODEL (CLARK COEFFICIENT)
(0004)   B     150       1       0       0       0       0       0       0       4
(0005)   B1      5
(0006)   J       1       6       1
(0007)   J1     .2      .4      .5      .6      .8     1.0
(0008)   K       0       1       0       0       0       0       1
(0009)   K1       1 SUB AREA-1 ABOVE DELTA RESERVOIR RUNOFF
(0010)   M       1       0     150       0    3456       0       0       0       1
(0011)   P       0    21.5    37.5    52.0    62.5    73.5    79.0
(0012)   T    .075     1.0     1.0
(0013)   W   14.97    7.29
(0014)   X     250    1900     1.3
(0015)   K       1    1001       0       0       0       0       1
(0016)   K1       2 ROUTE OVER DELTA DAM (USGS 3360)
(0017)   Y       0       0       0       1       1
(0018)   Y1      1       0       0       0       0       0   62330
(0019)   Y2  38500   50190   62330   64170   65540   66920   68750   69900   71500   76770
(0020)   Y3      0       0       0     337     956    1753    2698    3771    4957   10666
(0021)   K       1    1022       0       0       0       0       1
(0022)   K1       3 CHANNEL ROUTE - MOHAWK RIVER TO ROME ABOVE BARGE CANAL
(0023)   Y       0       0       0       0       1
(0024)   Y1      1       0       0       1      .3
(0025)   K       0       2       0       0       0       0       1
(0026)   K1       4 SUB AREA-2 RUNOFF
(0027)   M       1       0       7       0    3456       0       0       0       1
(0028)   P       0    21.9    37.5    52.0    62.5    73.5    79.0
(0029)   T    .075     2.0     1.0
(0030)   W    6.95    4.47
(0031)   X       7      50     1.3
(0032)   K       2    1002       0       0       0       0       1
(0033)   K1       5 COMBINING 2 HYDROGRAPHS FOR MOHAWK RIVER AT ROME
(0034)   K       1    1003       0       0       0       0       1
(0035)   K1       6 CHANNEL ROUTE - MOHAWK RIVER TO ORISKANY
(0036)   Y       0       0       0       0       1
(0037)   Y1      2       0       0    1.45     0.3
(0038)   K       0       3       0       0       0       0       1
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(0419)  K        0      33       0       0       0       0       1
(0420)  K1         90 SUB AREA-33  RUNOFF
(0421)  M        1       0      38       0    3456       0       0       0       1
(0422)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0423)  T     .075     1.0     1.0
(0424)  W    10.67    5.89
(0425)  X       49     400     1.3
(0426)  K        2    1033       0       0       0       0       1
(0427)  K1         91 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT SCHENECTADY
(0428)  K        1    1034       0       0       0       0       1
(0429)  K1         92 CHANNEL ROUTE - VISCHERS FERRY
(0430)  Y        0       0       0       0       1
(0431)  Y1       2       0       0     1.0      .2
(0432)  K        0      34       0       0       0       0       1
(0433)  K1         93 SUB AREA-34 RUNOFF
(0434)  M        1       0     108       0    3456       0       0       0       1
(0435)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0436)  T     .075     1.0     1.0
(0437)  W    14.85    8.61
(0438)  X      170    1250     1.3
(0439)  K        2      34       0       0       0       0       1
(0440)  K1         94 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT VISCHERS FERRY
(0441)  K        1    1035       0       0       0       0       1
(0442)  K1         95 CHANNEL ROUTE -MOHAWK RIVER AT COHOES  (USGS 3575)
(0443)  Y        0       0       0       0       1
(0444)  Y1       1       0       0     1.5      .2
(0445)  K        0      35       0       0       0       0       1
(0446)  K1         96 SUB AREA-35  RUNOFF
(0447)  M        1       0      33       0    3456       0       0       0       1
(0448)  P        0    21.9    37.5    52.0    62.5    73.5    79.0
(0449)  T     .075     1.0     1.0
(0450)  W    10.42    5.98
(0451)  X       41     370     1.3
(0452)  K        2    1035       0       0       0       0       1
(0453)  K1         97 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT COHOES (USGS 3575)
(0454)  K       99
(0455)  A
(0456)  A
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********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
********************************

RUN  DATE??FRI, AUG 10 1979
     TIME?11:48:04

                    MOHAWK RIVER BASIN
                    HEC-1DB
                    HYDROLOGIC MODEL (CLARK COEFFICIENT)

                                   JOB SPECIFICATION
             NQ     NHR    NMIN    IDAY     IHR    IMIN   METRC    IPLT    IPRT   NSTAN
            150       1       0       0       0       0       0       0       4       0
                                  JOPER     NWT   LROPT   TRACE
                                      5       0       0       0

                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                NPLAN= 1 NRTIO= 6 LRTIO= 1
              RTIOS=   0.20   0.40   0.50   0.60   0.80   1.00

          **********         **********         **********         **********         **********

                                 SUB-AREA RUNOFF COMPUTATION

                 1 SUB AREA-1 ABOVE DELTA RESERVOIR RUNOFF
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1       0       0       0       0       0       1       0       0

                                   HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       0  150.00    0.00 3456.00    0.00   0.000       0       1       0

                                     PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                      LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                            TC= 14.97     R=  7.29    NTA=  0

                                     RECESSION DATA
                        STRTQ=  250.00    QRCSN= 1000.00    RTIOR= 1.30
```

```
          UNIT HYDROGRAPH 47 END-OF-PERIOD ORDINATES, LAG=  12.33 HOURS, CP= 0.75  VOL= 1.00
      152.      561.     1125.     1765.     2446.     3147.     3856.     4552.     5158.     5606.
     5899.     6045.     6050.     5904.     5565.     4996.     4355.     3796.     3308.     2884.
     2513.     2191.     1910.     1664.     1451.     1265.     1102.      961.      837.      730.
      636.      555.      483.      421.      367.      320.      279.      243.      212.      185.
      161.      140.      122.      107.       93.       81.       71.

  0                                   END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                   SUM  16.07  12.00   4.07  1214552.
                                                                       ( 408.)( 305.)( 103.)(34392.25)

          **********          **********          **********          **********          **********

                                         HYDROGRAPH ROUTING

               2 ROUTE OVER DELTA DAM (USGS 3360)
                      ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                       1001        1        0        0        0        0        1        0        0
                                              ROUTING DATA
               QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                 0.0    0.000     0.00        1        1        0        0                 0

                      NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                          1        0        0    0.000    0.000    0.000   6233C.        0

STORAGE     38500.00   50160.00   62330.00   64170.00   65540.00   66920.00   68750.00   69500.00   71500.00

OUTFLOW         0.00       0.00       0.00     337.00     954.00    1753.00    2698.00    3771.00    4957.00

          **********          **********          **********          **********          **********

                                         HYDROGRAPH ROUTING

               3 CHANNEL ROUTE - MOHAWK RIVER TO ROME ABOVE BARGE CANAL
                      ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                       1022        1        0        0        0        0        1        0        0
                                              ROUTING DATA
               QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                 0.0    0.000     0.00        0        1        0        0                 0

                      NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                          1        0        0    1.000    0.300    0.000      0.         0

          **********          **********          **********          **********          **********
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                         SUB-AREA RUNOFF COMPUTATION

           4 SUB AREA-2 RUNOFF
                  ISTAG   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     2       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
         IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             1       0    7.00    0.00 3456.00    0.00   0.000       0       1       0

                                   PRECIP DATA
             SPFE     PMS      R6     R12     R24     R48     R72     R96
             0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                    LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.07    2.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                               UNIT HYDROGRAPH DATA
                          TC=  6.95     R=  4.47    NTA=  0

                                  RECESSION DATA
                       STRTQ=    7.00    QRCSN=   50.00    RTIOR= 1.30

        UNIT HYDROGRAPH 28 END-OF-PERIOD ORDINATES, LAG=   5.92 HOURS, CP= 0.69  VOL= 1.00
      55.      127.      249.      376.      477.      526.      516.      444.      355.      284.
     227.      181.      145.      115.       92.       74.       59.       47.       38.       30.
      24.       19.       15.       12.       10.        8.        6.        5.

  0                               END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  16.07  11.62   4.45   53901.
                                                                             ( 408.)( 295.)( 113.)( 1526.30)

        **********      **********      **********      **********      **********

                               COMBINE HYDROGRAPHS

           5 COMBINING 2 HYDROGRAPHS FOR MOHAWK RIVER AT ROME
                  ISTAG   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                   1002       2       0       0       0       0       1       0       0

        **********      **********      **********      **********      **********

                                HYDROGRAPH ROUTING

           6 CHANNEL ROUTE - MOHAWK RIVER TO ORISKANY
```

```
            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             1003       1       0       0       0       0       1       0       0
                                  ROUTING DATA
    QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
      0.0   0.000    0.00       0       1       0       0               0

            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                2       0       0   1.450   0.300   0.000      0.       0

**********      **********      **********      **********      **********

                          SUB-AREA RUNOFF COMPUTATION

   7 SUB AREA-3 RUNOFF
            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                3       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
      1       0  289.00    0.00 3456.00    0.00   0.000       0       1       0

                                   PRECIP DATA
         SPFE     PMS      R6     R12     R24     R48     R72     R96
         0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                    LOSS DATA
   LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
       0    0.13    2.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                              UNIT HYDROGRAPH DATA
                       TC= 17.65      R=  8.19     NTA=  0

                                  RECESSION DATA
                    STRTQ=  540.00     QRCSN= 4100.00     RTIOR= 1.30

        UNIT HYDROGRAPH 54 END-OF-PERIOD ORDINATES, LAG=  14.43 HOURS, CP= 0.76  VOL= 1.00
     205.      760.     1531.     2412.     3359.     4342.     5344.     6351.     7353.     8276.
    9014.     9563.     9919.    10098.    10165.     9935.     9567.     8899.     7983.     7064.
    6251.     5532.     4895.     4332.     3833.     3392.     3002.     2656.     2351.     2080.
    1841.     1629.     1442.     1276.     1129.      999.      884.      782.      692.      613.
     542.      480.      425.      376.      332.      294.      260.      230.      204.      180.
     160.      141.      125.      111.

0                                  END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                   SUM  16.07  10.18   5.89  2012222.
                                                                     ( 408.)( 259.)( 150.)(56979.73)
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**********          **********          **********          **********          **********

                              COMBINE HYDROGRAPHS

          8 COMBINE 2 HYDROGRAPHS FOR MOHAWK RIVER AT CRISKANY
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    1003       2       0       0       0       0       1       0       0

**********          **********          **********          **********          **********

                              HYDROGRAPH ROUTING

          9 CHANNEL ROUTE - MOHAWK RIVER TO UTICA
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    1004       1       0       0       0       0       1       0       0
                                         ROUTING DATA
          QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
            0.0    0.000    0.00       0       1       0       0               0

                   NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                       1       0       0   2.000   0.200   0.000      0.       0

**********          **********          **********          **********          **********

                              SUB-AREA RUNOFF COMPUTATION

          10 SUB AREA-4 RUNOFF
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       4       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
         1       0   93.00    0.00 3456.00    0.00   0.000       0       1       0

                                        PRECIP DATA
             SPFE     PMS      R6     R12     R24     R48     R72     R96
             0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                         LOSS DATA
  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
      0    0.13    2.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                    UNIT HYDROGRAPH DATA
                              TC= 13.44     R= 4.59     NTA= 0
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```
                                         RECESSION DATA
                              STRTQ=  140.00    QRCSN= 1100.00     RTIOR= 1.30

                UNIT HYDROGRAPH 45 END-OF-PERIOD ORDINATES, LAG=  11.23 HOURS, CP= 0.74  VOL= 1.00
         115.       425.       851.      1333.      1843.      2368.      2893.      3364.      3719.      3948.
        4058.      4051.      3914.      3590.      3144.      2723.      2359.      2044.      1771.      1534.
        1329.      1151.       997.       864.       748.       648.       562.       487.       422.       365.
         316.       274.       237.       206.       178.       154.       134.       116.       100.        87.
          75.        65.        57.        49.        42.

   0                                      END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  16.07  10.18   5.89   642854.
                                                                             ( 408.)( 259.)( 150.)(18203.58)

             **********          **********          **********          **********          **********

                                          COMBINE HYDROGRAPHS

                   11 COMBINE 2 HYDROGRAPHS FROM MOHAWK RIVER AT UTICA
                           ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                            1004        2        0        0        0        0        1        0        0

             **********          **********          **********          **********          **********

                                          HYDROGRAPH ROUTING

                   12 CHANNEL ROUTE - MOHAWK RIVER TO ILION
                           ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                            1005        1        0        0        0        0        1        0        0
                                                 ROUTING DATA
                   QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP             LSTR
                     0.0    0.000     0.00        0        1        0        0                0

                           NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                               2        0        0    2.450    0.200    0.000       0.        0

             **********          **********          **********          **********          **********

                                       SUB-AREA RUNOFF COMPUTATION

                   13 SUB AREA-5 RUNOFF
                           ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                               5        0        0        0        0        0        1        0        0

                                            HYDROGRAPH DATA
```

```
       IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
           1       0  158.00 3456.00  158.00    0.00   0.000       0       1       0

                                      PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.877

                                       LOSS DATA
       LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
           0    0.10    2.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                  UNIT HYDROGRAPH DATA
                            TC= 15.69      R=  8.17     NTA=  0

                                     RECESSION DATA
                      STRTQ=  265.00    QRCSN= 2100.00    RTIOR= 1.30

         UNIT HYDROGRAPH 52 END-OF-PERIOD ORDINATES, LAG=  13.21 HOURS, CP= 0.75  VOL= 1.00
      134.      497.     1000.     1577.     2195.     2838.     3492.     4149.     4757.     5245.
     5596.     5817.     5915.     5887.     5721.     5355.     4814.     4259.     3768.     3333.
     2944.     2608.     2308.     2041.     1806.     1598.     1413.     1250.     1106.      979.
      866.      766.      678.      599.      530.      469.      415.      367.      325.      287.
      254.      225.      199.      176.      156.      138.      122.      108.       95.       84.
       75.       66.

     0                                END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  15.18  10.08   5.10  1085146.
                                                                             ( 386.)( 256.)( 130.)(30727.88)

          **********          **********          **********          **********          **********

                                  COMBINE HYDROGRAPHS

             14 COMBINE 2 HYDROGRAPHS FOR MOHAWK RIVER AT ILION
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
              [illegible]5      2       0       0       0       0       1       0       0

          **********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

             15 CHANNEL ROUTE - MOHAWK RIVER BELOW W. CANADA CREEK
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     1010       1       0       0       0       0       1       0       0
                                      ROUTING DATA
             QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
```

```
         0.0   0.000    0.00        0        1        0        0                  0

                    NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                        1        0        0    1.500    0.200    0.000       0.        0

  **********        **********        **********        **********        **********

                                 SUB-AREA RUNOFF COMPUTATION

        16 SUB AREA-6 RUNOFF
                    ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                        6        0        0        0        0        0        1        0        0

                                      HYDROGRAPH DATA
            IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                1        0   375.00     0.00  3456.00     0.00    0.000        0        1        0

                                        PRECIP DATA
                   SPFE      PMS       R6      R12      R24      R48      R72      R96
                   0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                         LOSS DATA
       LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
           0     0.07     1.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                                      UNIT HYDROGRAPH DATA
                              TC= 22.55     R= 15.88     NTA=  0

                                       RECESSION DATA
                        STRTQ=   725.00     QRCSN=  5700.00     RTIOR=  1.30

            UNIT HYDROGRAPH 97 END-OF-PERIOD ORDINATES, LAG=  20.02 HOURS, CP= 0.68  VOL= 1.00
          98.      367.      754.     1212.     1722.     2270.     2847.     3446.     4063.     4692.
        5330.     5963.     6547.     7051.     7475.     7822.     8093.     8287.     8404.     8440.
        8389.     8234.     7919.     7476.     7019.     6591.     6188.     5811.     5456.     5123.
        4810.     4516.     4241.     3982.     3739.     3510.     3296.     3095.     2906.     2728.
        2562.     2406.     2259.     2121.     1991.     1870.     1756.     1648.     1548.     1453.
        1365.     1281.     1203.     1130.     1061.      996.      935.      878.      824.      774.
         727.      682.      641.      602.      565.      530.      498.      468.      439.      412.
         387.      363.      341.      320.      301.      283.      265.      249.      234.      220.
         206.      194.      182.      171.      160.      150.      141.      133.      125.      117.
         110.      103.       97.       91.       85.       80.       75.
       0                                 END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                     SUM  16.07  12.00   4.07  2988156.
                                                                        ( 408.)( 305.)( 103.)(84615.08)
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**********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

              17 CHANNEL ROUTE - W. CANADA CREEK BELOW HINCKLEY RESERVOIR (USGS 3440)
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1006       1       0       0       0       0       1       0       0
                                        ROUTING DATA
               QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                 0.0   0.000    0.00       1       1       0       0                0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             1       0       0   0.000   0.000   0.000 157900.       0

STORAGE      53170.00    86400.00   129710.00   157900.00   161100.00   164540.00   167750.00   170960.00   174400.00

OUTFLOW          0.00        0.00        0.00        0.00      474.00     1340.00     2462.00     3790.00     5297.00


**********          **********          **********          **********          **********

                                 SUB-AREA RUNOFF COMPUTATION

              18 SUB AREA-7 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                             7       0       0       0       0       0       1       0       0

                                      HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       0    7.00    0.00 3456.00    0.00   0.000       0       1       0

                                        PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                         LOSS DATA
         LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                             TC=  7.12     R=  4.91     NTA=  0

                                       RECESSION DATA
                         STRTQ=    7.00    QRCSN=   50.00    RTIOR= 1.30

           UNIT HYDROGRAPH 30 END-OF-PERIOD ORDINATES, LAG=   6.06 HOURS, CP= 0.66  VOL= 1.00
         31.      113.      223.      340.      437.      491.      494.      440.      360.      293.
        239.      195.      159.      130.      106.       86.       70.       57.       47.       36.
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```
 31.      25.      21.      17.      14.      11.       9.       7.       6.       5.

      0                                  END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                       SUM  16.07  12.00   4.07   55565.
                                                                          ( 408.)( 305.)( 103.)( 1573.42)

   **********      **********      **********      **********      **********

                                  COMBINE HYDROGRAPHS

             19 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK AT TRENTON
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       1007       2       0       0       0       0       1       0       0

   **********      **********      **********      **********      **********

                              SUB-AREA RUNOFF COMPUTATION

             20 SUB AREA-8 RUNOFF
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          8       0       0       0       0       0       1       0       0

                                   HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       0   53.00    0.00 3456.00    0.00   0.000       0       1       0

                                    PRECIP DATA
                  SPFE    PMS     R6     R12     R24     R48     R72     R96
                  0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                     LOSS DATA
       LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
          0    0.07   1.00   1.00   0.00   0.00   1.00   0.00   0.00   0.00   0.00

                                 UNIT HYDROGRAPH DATA
                           TC= 11.62     R=  6.25     NTA=  0

                                    RECESSION DATA
                      STRTQ=   72.00    QRCSN=  550.00    RTIOR= 1.30

       UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG=   9.71 HOURS, CP= 0.73   VOL= 1.00
     90.      333.      663.     1032.     1420.     1814.     2169.     2430.     2584.     2638.
   2566.     2369.     2079.     1771.     1509.     1285.     1095.      933.      795.      677.
    577.      491.      419.      356.      304.      259.      220.      188.      160.      136.
    116.       99.       84.       72.       61.       52.       44.       38.       32.       27.
```

```
    C                                        END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                           SUM  16.07  12.00   4.07   426114.
                                                                              ( 408.)( 305.)( 103.)(12066.15)

          **********          **********          **********          **********          **********

                                         COMBINE HYDROGRAPHS

                      21 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK BELOW CINNCINNATI CREEK
                               ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                1008        2        0        0        0        0        1        0        0

          **********          **********          **********          **********          **********

                                         HYDROGRAPH ROUTING

                      22 CHANNEL ROUTE - W. CANADA CREEK TO KAST BRIDGE (USGS 3460)
                               ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                1009        1        0        0        0        0        1        0        0
                                                      ROUTING DATA
                       QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                         0.0    0.000     0.00        0        1        0        0                 0

                               NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                                   4        0        0    1.080    0.300    0.000       0.        0

          **********          **********          **********          **********          **********

                                      SUB-AREA RUNOFF COMPUTATION

                      23 SUB AREA-9 RUNOFF
                               ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                                   9        0        0        0        0        0        1        0        0
                                                    HYDROGRAPH DATA
                   IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                       1        0   121.00     0.00  3456.00     0.00    0.000        0        1        0
                                                     PRECIP DATA
                            SPFE      PMS       R6      R12      R24      R48      R72      R96
                            0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929
                                                      LOSS DATA
                LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
                    0     0.07     1.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00
```

```
                              UNIT HYDROGRAPH DATA
                        TC= 14.17      R=  7.00     NTA=  0

                                RECESSION DATA
                     STRTQ=  150.00     QRCSN= 1450.00      RTIOR= 1.30

          UNIT HYDROGRAPH 45 END-OF-PERIOD ORDINATES, LAG=  11.63 HOURS, CP= 0.75  VOL= 1.00
      138.       510.      1021.      1598.      2210.      2839.      3473.      4072.      4555.      4887.
     5079.      5135.      5055.      4812.      4345.      3775.      3272.      2836.      2458.      2130.
     1846.      1600.      1386.      1202.      1041.       903.       782.       678.       588.       509.
      441.       382.       331.       287.       249.       216.       187.       162.       140.       122.
      106.        91.        79.        69.        60.

  0                                       END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  16.07  12.00   4.07   977729.
                                                                              ( 408.)( 305.)( 103.)(27686.18)

         **********          **********          **********          **********          **********

                                     COMBINE HYDROGRAPHS

             24 COMBINE 2 HYDROGRAPHS FOR W. CANADA CREEK AT KAST BRIDGE (USGS 3460)
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1009       2       0       0       0       0       1       0       0

         **********          **********          **********          **********          **********

                                     HYDROGRAPH ROUTING

             25 CHANNEL ROUTE - W. CANADA CREEK TO MOHAWK RIVER
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1010       1       0       0       0       0       1       0       0
                                                ROUTING DATA
                 QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                   0.0   0.000    0.00       0       1       0       0               0

                         NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                             1       0       0   0.720   0.300   0.000      0.       0


         **********          **********          **********          **********          **********

                                  SUB-AREA RUNOFF COMPUTATION

             26 SUB AREA-10 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
```

```
          10         0         0         0         0         0         1         0         0

                                      HYDROGRAPH DATA
      IHYDG     IUHG    TAREA     SNAF    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
          1        0    45.00     0.00  3456.00     0.00    0.000        0        1        0

                                        PRECIP DATA
               SPFE      PMS       R6      R12      R24      R48      R72      R96
               0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                         LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
         0    0.07    2.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                            TC= 11.33     R=  6.41     NTA=  0

                                       RECESSION DATA
                       STRTQ=   60.00     QRCSN=  500.00     RTIOR= 1.30

        UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG=   9.46 HOURS, CP= 0.72   VOL= 1.00
       78.       287.       572.       892.      1229.      1570.      1871.      2085.      2208.      2242.
     2160.      1984.      1712.      1464.      1252.      1071.       916.       783.       670.       573.
      490.       419.       359.       307.       262.       224.       192.       164.       140.       120.
      103.        88.        75.        64.        55.        47.        40.        34.        29.        25.
       22.

     0                                 END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                             SUM  16.07  11.62   4.45  351728.
                                                                                ( 408.)( 295.)( 113.)( 9959.82)

     **********          **********          **********          **********          **********

                                     COMBINE HYDROGRAPHS

               27 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW W. CANADA CREEK
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1010       3       0       0       0       0       1       0       0

     **********          **********          **********          **********          **********

                                     HYDROGRAPH ROUTING

               28 CHANNEL ROUTE - MOHAWK RIVER AT LITTLE FALLS
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1011       1       0       0       0       0       1       0       0
```

```
                              ROUTING DATA
      QLOSS   CLOSS    AVG    IRES  ISAME   IOPT   IPMP          LSTR
        0.0   0.000   0.00      0      1      0      0             0

              NSTPS   NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                  1       0      0  2.100  0.200  0.000     0.       0

 **********  **********  **********  **********  **********

                     SUB-AREA RUNOFF COMPUTATION

    29 SUB AREA-11 RUNOFF
              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                 11       0       0       0       0       0       1       0       0

                            HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP    TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
         1       0   27.00    0.00  3456.00    0.00   0.000       0       1       0

                              PRECIP DATA
           SPFE     PMS      R6     R12     R24     R48     R72     R96
           0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                               LOSS DATA
    LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
        0   0.07   1.00   1.00   0.00   0.00   1.00   0.00   0.00   0.00   0.00

                         UNIT HYDROGRAPH DATA
                      TC=  9.63    R=  5.63    NTA=  0

                             RECESSION DATA
                  STRTQ=   32.00    QRCSN=  280.00    RTIOR= 1.30

        UNIT HYDROGRAPH 36 END-OF-PERIOD ORDINATES, LAG=  8.20 HOURS, CP= 0.71  VOL= 1.00
      65.     239.     473.     733.    1004.    1250.    1428.    1522.    1535.    1446.
    1259.    1054.     882.     738.     618.     517.     433.     362.     303.     254.
     212.     178.     149.     124.     104.      87.      73.      61.      51.      43.
      36.      30.      25.      21.      18.      15.

                               END-OF-PERIOD FLOW
      0
 MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q    MO.DA  HR.MN  PERIOD  RAIN   EXCS   LOSS   COMP Q

                                                          SUM  16.07  12.00   4.07  217007.
                                                             ( 408.)( 305.)( 103.)( 6144.95)

 **********  **********  **********  **********  **********

                             COMBINE HYDROGRAPHS
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```
30 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER IN LITTLE FALLS
             ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
              1011        2        0        0        0        0        1        0        0

**********          **********          **********          **********          **********

                                    HYDROGRAPH ROUTING

31 CHANNEL ROUTE - MOHAWK RIVER AT LITTLE FALLS (USGS 3470)
             ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
              1012        1        0        0        0        0        1        0        0
                                    ROUTING DATA
    QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
      0.0    0.000     0.00        0        1        0        0                 0

             NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                 1        0        0    1.700    0.200    0.000       0.        0

**********          **********          **********          **********          **********

                               SUB-AREA RUNOFF COMPUTATION

32 SUB AREA-12 RUNOFF
             ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                12        0        0        0        0        0        1        0        0
                                    HYDROGRAPH DATA
     IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
         1        0    23.00     0.00  3456.00     0.00    0.000        0        1        0

                                    PRECIP DATA
              SPFE      PMS       R6      R12      R24      R48      R72      R96
              0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                    LOSS DATA
     LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
         0     0.07     1.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                                    UNIT HYDROGRAPH DATA
                         TC=  9.46      R=  5.54     NTA=  0

                                    RECESSION DATA
                   STRTQ=    27.00     QRCSN=   250.00     RTIOR= 1.30

    UNIT HYDROGRAPH 35 END-OF-PERIOD ORDINATES, LAG=   8.04 HOURS, CP= 0.72  VOL= 1.00
       60.      219.      433.      670.      915.     1130.     1275.     1342.     1322.     1217.
     1034.      863.      720.      601.      501.      418.      349.      291.      243.      203.
      169.      141.      118.       98.       82.       68.       57.       48.       40.       33.
```

```
     ....      ....     ....     ...      ...      ...      ...      ...      ...      ...
     24.       23.      19.      16.      13.

                                          END-OF-PERIOD FLOW
  C
MO.DA  HR.MN  PERIOD   RAIN    EXCS    LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN    EXCS    LOSS    COMP Q

                                                                          SUM  16.07   12.00    4.07   185130.
                                                                             ( 408.)( 305.)( 103.)( 5242.29)


     **********          **********          **********          **********          **********

                                        COMBINE HYDROGRAPHS

             33 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER IN LITTLE FALLS (USGS 3470)
                       ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                        1012        2        0        0        0        0        1        0        0

     **********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

             34 CHANNEL ROUTE - MOHAWK RIVER BELOW E. CANADA CREEK
                       ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                        1015        1        0        0        0        0        1        0        0
                                                 ROUTING DATA
              QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                0.0    0.000     0.00        0        1        0        0                 0

                       NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                           1        0        0    0.900    0.200    0.000       0.        0


     **********          **********          **********          **********          **********

                                        SUB-AREA RUNOFF COMPUTATION

             35 SUB AREA-13 RUNOFF
                       ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                          13        0        0        0        0        0        1        0        0

                                                 HYDROGRAPH DATA
              IHYDG    IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                  1       0   261.00     0.00  3456.00     0.00    0.000        0        1        0

                                                 PRECIP DATA
                SPFE      PMS       R6      R12      R24      R48      R72      R96
                0.00    29.10    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929
```

```
                                        LOSS DATA
        LROPT    STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0       0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                           TC= 17.09       R=  7.86     NTA=  0

                                      RECESSION DATA
                      STRTQ=  480.00     QRCSN= 3650.00     RTIOR= 1.30

          UNIT HYDROGRAPH 52 END-OF-PERIOD ORDINATES, LAG=  14.02 HOURS, CP= 0.77  VOL= 1.00
       201.       746.      1500.      2361.      3283.      4237.      5206.      6181.      7137.      7985.
      8637.      9093.      9367.      9466.      9392.      9134.      8646.      7843.      6913.      6088.
      5361.      4722.      4158.      3662.      3225.      2840.      2501.      2203.      1940.      1708.
      1505.      1325.      1167.      1028.       905.       797.       702.       618.       544.       479.
       422.       372.       327.       288.       254.       224.       197.       173.       153.       135.
       118.       104.

      0                                END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM  21.36  16.91   4.45  2943572.
                                                                           ( 542.)( 430.)( 113.)(83352.59)

      **********          **********          **********          **********          **********

                                    SUB-AREA RUNOFF COMPUTATION

              36 SUB AREA-14 RUNOFF
                     ISTAQ   ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE   IAUTO
                      14        0        0        0        0        0        1        0        0

                                          HYDROGRAPH DATA
           IHYDG    IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME   LOCAL
             1        0     30.00     0.00  3456.00     0.00    0.000      0        1       0

                                           PRECIP DATA
                    SPFE      PMS       R6      R12      R24      R48      R72      R96
                    0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                        LOSS DATA
        LROPT    STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0       0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                           TC= 10.04       R=  5.64     NTA=  0

                                      RECESSION DATA
                      STRTQ=   37.00     QRCSN=  320.00     RTIOR= 1.30
```

```
      UNIT HYDROGRAPH 36 END-OF-PERIOD ORDINATES, LAG=   8.31 HOURS, CP= 0.71  VOL= 1.00
        70.       257.       509.       788.      1079.      1350.      1551.      1663.      1689.      1618.
      1429.      1197.      1002.       839.       702.       586.       492.       412.       345.       289.
       242.       202.       169.       142.       119.        99.        83.        70.        58.        49.
        41.        34.        29.        24.        20.        17.

                 0                                  END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM  16.07  12.00   4.07  241583.
                                                                           ( 408.)( 305.)( 103.)( 6835.20)

     **********          **********          **********          **********          **********

                                        COMBINE HYDROGRAPHS

           37 COMBINE 2 HYDROGRAPHS AT E. CANADA CREEK AT EAST CREEK (USGS 3480)
                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                    1014        2        0        0        0        0        1        0        0

     **********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

           38 CHANNEL ROUTE - E. CANADA CREEK TO EAST CREEK (USGS 3480)
                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                    1014        1        0        0        0        0        1        0        0
                                           ROUTING DATA
           QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
             0.0    0.000     0.00        0        1        0        0                 0

                   NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                       1        0        0   14.000    0.000    0.000       0.        0

     **********          **********          **********          **********          **********

                                        HYDROGRAPH ROUTING

           39 CHANNEL ROUTE - MOHAWK RIVER BELOW E. CANADA CREEK
                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                    1015        1        0        0        0        0        1        0        0
                                           ROUTING DATA
           QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
             0.0    0.000     0.00        0        1        0        0                 0

                   NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                       1        0        0    1.000    0.200    0.000       0.        0
```

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**********     **********     **********     **********     **********

                    SUB-AREA RUNOFF COMPUTATION

     40 SUB AREA-15 RUNOFF
          ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
            15       0       0       0      0      0      1      0       0

                              HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP    TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
       1        0    37.00    0.00  3456.00   0.00   0.000      0       1       0

                              PRECIP DATA
            SPFE     PMS     R6      R12     R24     R48     R72     R96
            0.00    21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                              LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
       0     0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                         UNIT HYDROGRAPH DATA
                    TC= 10.48     R=  5.86     NTA=  0

                            RECESSION DATA
               STRTQ=   44.00     QRCSN=  400.00     RTIOR= 1.30

     UNIT HYDROGRAPH 37 END-OF-PERIOD ORDINATES, LAG=   8.87 HOURS, CP= 0.73  VOL= 1.00
      70.     287.     570.     885.    1214.    1532.    1785.    1941.    2002.    1967.
    1798.    1542.    1249.    1095.     923.     778.     655.     552.     466.     392.
     331.     279.     235.     198.     167.     141.     118.     100.      84.      71.
      60.      50.      42.      36.      30.      25.      21.

 0                            END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                               SUM  16.07  12.00   4.07   297725.
                                                                  ( 408.)( 305.)( 103.)( 8430.63)


**********     **********     **********     **********     **********

                          COMBINE HYDROGRAPHS

     41 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW E. CANADA CREEK
          ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
           1015      3       0       0      0      0      1      0       0

**********     **********     **********     **********     **********
```

HYDROGRAPH ROUTING

42 CHANNEL ROUTE - MOHAWK RIVER BELOW CAROGA CREEK

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1016	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	2.500	0.200	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

43 SUB AREA-16 RUNOFF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	0	151.00	0.00	3456.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.90	37.50	52.00	62.50	73.50	79.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.929

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.07	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

UNIT HYDROGRAPH DATA

TC= 18.56 R= 17.91 NTA= 0

RECESSION DATA

STRTQ= 250.00 QRCSN= 3500.00 RTIOR= 1.30

UNIT HYDROGRAPH100 END-OF-PERIOD ORDINATES, LAG= 17.35 HOURS, CP= 0.59 VOL= 0.[illegible]

47.	177.	363.	586.	834.	1102.	1385.	1681.	1986.	2293.
2578.	2824.	3030.	3196.	3321.	3405.	3443.	3428.	3333.	3171.
2999.	2836.	2682.	2536.	2399.	2268.	2145.	2029.	1918.	1814.
1716.	1622.	1534.	1451.	1372.	1298.	1227.	1161.	1097.	1038.
981.	928.	878.	830.	785.	742.	702.	664.	628.	594.
561.	531.	502.	475.	449.	425.	402.	380.	359.	340.
321.	304.	287.	272.	257.	243.	230.	217.	205.	194.
184.	174.	164.	155.	147.	139.	131.	124.	118.	111.
105.	99.	94.	89.	84.	80.	75.	71.	67.	64.

```
      60.      57.      54.      51.      48.      45.      43.      41.      38.      36.

     0                                END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM  16.07  12.00   4.07  1212509.
                                                                           ( 408.)( 305.)( 103.)(34334.40)

      **********        **********        **********        **********        **********

                                   COMBINE HYDROGRAPHS

             44 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER BELOW CAROGA CREEK
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       1016       2       0       0       0       0       1       0       0

      **********        **********        **********        **********        **********

                                   HYDROGRAPH ROUTING

             45 CHANNEL ROUTE - MOHAWK RIVER BELOW OTSQUAGO CREEK
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       1018       1       0       0       0       0       1       0       0
                                        ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          1       0       0   1.000   0.200   0.000      0.       0

      **********        **********        **********        **********        **********

                                   SUB-AREA RUNOFF COMPUTATION

             46 SUB AREA-17 RUNOFF
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         17       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       0   59.20    0.00 3456.00    0.00   0.000       0       1       0

                                        PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                        LOSS DATA
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```
                                           LOSS DATA
  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
    0      0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                     UNIT HYDROGRAPH DATA
                              TC= 11.66      R=  6.26     NTA=  0

                                        RECESSION DATA
                          STRTQ=    82.00      QRCSN=  600.00      RTIOR= 1.30

       UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG=    9.98 HOURS, CP= 0.74   VOL= 1.00
      94.      359.      715.     1114.     1533.     1959.     2352.     2649.     2832.     2907.
    2873.     2700.     2381.     2029.     1729.     1473.     1255.     1069.      911.      776.
     661.      564.      480.      409.      349.      297.      253.      216.      184.      157.
     133.      114.       97.       83.       70.       60.       51.       44.       37.       32.

        0                                   END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                            SUM   16.07  12.00   4.07   475522.
                                                                                ( 408.)( 305.)( 103.)(13465.27)


       ..........         ..........         ..........         ..........         ..........


                                 SUB-AREA RUNOFF COMPUTATION

               47 SUB-AREA-18 RUNOFF
                       ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         18       0       0       0       0       0       1       0       0

                                          HYDROGRAPH DATA
             IHYDG    IUHG   TAREA     SNAP    TRSDA    TRSPC    RATIO   ISNOW   ISAME   LOCAL
                1        0   13.10     0.00  3456.00     0.00    0.000      0       1       0

                                           PRECIP DATA
                      SPFE      PMS       R6      R12      R24      R48      R72      R96
                      0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
 TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                           LOSS DATA
  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
    0      0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                     UNIT HYDROGRAPH DATA
                              TC=  8.25      R=  5.22     NTA=  0

                                        RECESSION DATA
                          STRTQ=    14.00      QRCSN=  100.00      RTIOR= 1.30

       UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG=    7.04 HOURS, CP= 0.69   VOL= 1.00
      44.      141.      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]      [illegible]
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    516.      426.      351.      290.      239.      197.      163.      134.      111.       92.
     76.       62.       51.       42.       35.       29.       24.       20.       16.       13.
     11.        9.        8.

    0                                    END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                              SUM  16.07  12.00   4.07   104233.
                                                                  ( 408.)( 305.)( 103.)( 2951.55)


     **********          **********          **********          **********          **********

                              COMBINE HYDROGRAPHS

          48 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW OTSQUAGO CREEK
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     1016       3       0       0       0       0       1       0       0

     **********          **********          **********          **********          **********

                              HYDROGRAPH ROUTING

          49 CHANNEL ROUTE-MOHAWK RIVER BELOW CANAJOHARIE  CREEK
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                     1019       1       0       0       0       0       1       0       0
                                          ROUTING DATA
           QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
             0.0    0.000    0.00       0       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        1       0       0   1.200   0.200   0.000      0.       0

     **********          **********          **********          **********          **********

                              SUB-AREA RUNOFF COMPUTATION

          50 SUB AREA - 19 RUNOFF
                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       19       0       0       0       0       0       1       0       0

                                         HYDROGRAPH DATA
        IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
            1       0   72.00    0.00 3456.00    0.00   0.000       0       1       0

                                          PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929
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                                        LOSS DATA
  LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
      0     0.07     1.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                                   UNIT HYDROGRAPH DATA
                          TC= 12.44      R=  6.41     NTA=  0

                                      RECESSION DATA
                      STRTQ=  103.00     QRCSN=  700.00     RTIOR= 1.30

     UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG= 10.28 HOURS, CP= 0.74  VOL= 1.00
    108.      399.      796.     1241.     1709.     2187.     2646.     3018.     3265.     3393.
   3406.     3294.     3004.     2601.     2225.     1903.     1627.     1392.     1190.     1018.
    871.      745.      637.      545.      466.      399.      341.      292.      249.      213.
    182.      156.      133.      114.       98.       83.       71.       61.       52.       45.
     38.

    0                                  END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                      SUM  16.07  12.00   4.07   577484.
                                                                         ( 408.)( 305.)( 103.)(16352.51)

      **********          **********          **********          **********          **********

                                    COMBINE HYDROGRAPHS

             51 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER BELOW CANAJOHARIE CREEK
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1019        2        0        0        0        0        1        0        0

      **********          **********          **********          **********          **********

                                    HYDROGRAPH ROUTING

             52 CHANNEL ROUTE - MOHAWK RIVER AT SPRAKERS
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1020        1        0        0        0        0        1        0        0
                                             ROUTING DATA
             QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
               0.0    0.000     0.00        0        1        0        0                 0

                        NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                            1        0        0    1.200    0.200    0.000       0.        0

      **********          **********          **********          **********          **********
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                              SUB-AREA RUNOFF COMPUTATION

              53 SUB AREA-20 RUNOFF
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            20       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAP  TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
               1       0   55.00    0.00 3456.00   0.00   0.000       0       1       0

                                          PRECIP DATA
                   SPFE     PMS      R6     R12     R24     R48     R72     R96
                   0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                           LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                     UNIT HYDROGRAPH DATA
                                TC= 11.78      R=  6.38     NTA=  0

                                        RECESSION DATA
                           STRTQ=   75.00     QRCSN=  550.00     RTIOR= 1.30

          UNIT HYDROGRAPH 41 END-OF-PERIOD ORDINATES, LAG=   9.94 HOURS, CP= 0.74   VOL= 1.00
       90.      332.      662.     1032.     1422.     1819.     2182.     2455.     2623.     2690.
     2655.     2483.     2184.     1867.     1596.     1364.     1165.      996.      851.      728.
      622.      531.      454.      388.      332.      284.      242.      207.      177.      151.
      129.      110.       94.       81.       69.       59.       50.       43.       37.       31.
       27.

      0                                 END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                        SUM  16.07  12.00   4.07  441616.
                                                                          ( 408.)( 305.)( 103.)(12505.16)

          **********        **********        **********        **********        **********

                                     COMBINE HYDROGRAPHS

               54 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT SPRAKERS
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                          1020       2       0       0       0       0       1       0       0

          **********        **********        **********        **********        **********

                                      HYDROGRAPH ROUTING
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55 CHANNEL ROUTE - MOHAWK RIVER BELOW CAYADUTTA CREEK
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
           1023       1       0       0       0       0       1       0       0
                                  ROUTING DATA
 QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP           LSTR
   0.0    0.000    0.00       0       1       0       0              0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              2       0       0   1.550   0.200   0.000      0.       0

**********          **********          **********          **********          **********

                          SUB-AREA RUNOFF COMPUTATION

56 SUB AREA-21    RUNOFF
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             21       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
   IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
       1       0   12.70    0.00 3456.00    0.00   0.000       0       1       0

                                  PRECIP DATA
             SPFE     PMS      R6     R12     R24     R48     R72     R96
             0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                   LOSS DATA
  LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
      0    0.07    1.30    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                              UNIT HYDROGRAPH DATA
                        TC=  8.61     R=  6.32     NTA=  0

                                 RECESSION DATA
                   STRTQ=   13.00     QRCSN=  120.00     RTIOR= 1.30

    UNIT HYDROGRAPH 39 END-OF-PERIOD ORDINATES, LAG=   7.38 HOURS, CP= 0.65  VOL= 1.00
     34.       124.      247.      384.      523.      636.      705.      727.      689.      604.
    516.       440.      376.      320.      274.      233.      199.      170.      145.      124.
    106.        90.       77.       66.       56.       48.       41.       35.       30.       25.
     22.        18.       16.       13.       11.       10.        8.        7.        6.

      0                                   END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                            SUM  16.07  11.90   4.17  100847.
                                                                               ( 408.)( 302.)( 106.)( 2855.67)
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  **********         **********         **********         **********         **********

                              SUB-AREA RUNOFF COMPUTATION

              57 SUB AREA-22  RUNOFF
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      22       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
               1       0   23.00    0.00 3456.00    0.00   0.000       0       1       0

                                      PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                       LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.07    1.30    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                 UNIT HYDROGRAPH DATA
                            TC=  9.61     R=  5.86    NTA=  0

                                     RECESSION DATA
                        STRTQ=   27.00    QRCSN=  250.00    RTIOR= 1.30

        UNIT HYDROGRAPH 37 END-OF-PERIOD ORDINATES, LAG=   8.15 HOURS, CP= 0.70  VOL= 1.00
         55.      203.      404.      626.      859.     1067.     1214.     1290.     1294.     1204.
       1041.      877.      739.      623.      525.      442.      373.      314.      265.      223.
        188.      159.      134.      113.       95.       80.       67.       57.       48.       40.
         34.       29.       24.       20.       17.       14.       12.

      0                                 END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                   SUM  16.07  11.90   4.17  183691.
                                                                      ( 408.)( 302.)( 106.)( 5201.54)

  **********         **********         **********         **********         **********

                                  COMBINE HYDROGRAPHS

              58 COMBINE 2 HYDROGRAPHS AT CATADUTTA CREEK AT JOHNSTOWN
                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    1022       2       0       0       0       0       1       0       0

  **********         **********         **********         **********         **********
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                                    HYDROGRAPH ROUTING

                   59 CHANNEL ROUTE - MOHAWK RIVER BELOW CAYADUTTA CREEEK
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         1023       1       0       0       0       0       1       0       0
                                               ROUTING DATA
                   QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                     0.0   0.000    0.00       0       1       0       0               0

                           NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                               1       0       0   1.400   0.300   0.000      0.       0

        **********      **********      **********      **********      **********

                                    SUB-AREA RUNOFF COMPUTATION

                   60 SUB AREA-23  RUNOFF
                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           23       0       0       0       0       1       0       0       0

                                               HYDROGRAPH DATA
                 IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                     1       0   84.00    0.00 3456.00    0.00   0.000       0       1       0

                                                 PRECIP DATA
                        SPFE     PMS      R6     R12     R24     R48     R72     R96
                        0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                                  LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                             UNIT HYDROGRAPH DATA
                                        TC= 13.14     R=  6.92    NTA=  0

                                                RECESSION DATA
                                  STRTQ=   125.00    QRCSN=   870.00    RTIOR= 1.30

                  UNIT HYDROGRAPH 44 END-OF-PERIOD ORDINATES, LAG=  11.06 HOURS, CP= 0.74  VOL= 1.00
              107.      400.      801.     1254.     1734.     2226.     2716.     3144.     3457.     3651.
             3733.     3701.     3536.     3191.     2767.     2394.     2071.     1792.     1551.     1342.
             1161.     1004.      869.      752.      651.      563.      487.      421.      365.      315.
              273.      236.      204.      177.      153.      132.      115.       99.       86.       74.
               64.       56.       48.       42.

        0                                END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
      1.01   1.00       1   0.13   0.00   0.03     122.        1.04   4.00      76   0.00   0.00   0.00     1927.
```

1.01	2.00	2	0.03	0.00	0.03	119.	1.04	5.00	77	0.00	0.00	0.00	1685.
1.01	3.00	3	0.03	0.00	0.03	116.	1.04	6.00	78	0.00	0.00	0.00	1446.
1.01	4.00	4	0.03	0.00	0.03	113.	1.04	7.00	79	0.00	0.00	0.00	1240.
1.01	5.00	5	0.03	0.00	0.03	110.	1.04	8.00	80	0.00	0.00	0.00	1059.
1.01	6.00	6	0.03	0.00	0.03	107.	1.04	9.00	81	0.00	0.00	0.00	893.
1.01	7.00	7	0.09	0.00	0.09	104.	1.04	10.00	82	0.00	0.00	0.00	851.
1.01	8.00	8	0.09	0.00	0.09	101.	1.04	11.00	83	0.00	0.00	0.00	829.
1.01	9.00	9	0.09	0.00	0.09	99.	1.04	12.00	84	0.00	0.00	0.00	808.
1.01	10.00	10	0.09	0.00	0.09	96.	1.04	13.00	85	0.00	0.00	0.00	787.
1.01	11.00	11	0.09	0.00	0.09	94.	1.04	14.00	86	0.00	0.00	0.00	766.
1.01	12.00	12	0.09	0.00	0.09	91.	1.04	15.00	87	0.00	0.00	0.00	746.
1.01	13.00	13	0.13	0.04	0.10	93.	1.04	16.00	88	0.00	0.00	0.00	727.
1.01	14.00	14	0.16	0.08	0.09	110.	1.04	17.00	89	0.00	0.00	0.00	708.
1.01	15.00	15	0.20	0.12	0.08	158.	1.04	18.00	90	0.00	0.00	0.00	690.
1.01	16.00	16	0.51	0.43	0.08	285.	1.04	19.00	91	0.00	0.00	0.00	672.
1.01	17.00	17	0.19	0.11	0.07	523.	1.04	20.00	92	0.00	0.00	0.00	655.
1.01	18.00	18	0.15	0.07	0.07	846.	1.04	21.00	93	0.00	0.00	0.00	638.
1.01	19.00	19	0.04	0.00	0.04	1221.	1.04	22.00	94	0.00	0.00	0.00	621.
1.01	20.00	20	0.04	0.00	0.04	1621.	1.04	23.00	95	0.00	0.00	0.00	605.
1.01	21.00	21	0.04	0.00	0.04	2023.	1.05	0.00	96	0.00	0.00	0.00	589.
1.01	22.00	22	0.04	0.00	0.04	2406.	1.05	1.00	97	0.00	0.00	0.00	574.
1.01	23.00	23	0.04	0.00	0.04	2739.	1.05	2.00	98	0.00	0.00	0.00	559.
1.02	0.00	24	0.04	0.00	0.04	2986.	1.05	3.00	99	0.00	0.00	0.00	545.
1.02	1.00	25	0.14	0.07	0.07	3143.	1.05	4.00	100	0.00	0.00	0.00	531.
1.02	2.00	26	0.14	0.07	0.07	3220.	1.05	5.00	101	0.00	0.00	0.00	517.
1.02	3.00	27	0.14	0.07	0.07	3219.	1.05	6.00	102	0.00	0.00	0.00	504.
1.02	4.00	28	0.14	0.07	0.07	3145.	1.05	7.00	103	0.00	0.00	0.00	491.
1.02	5.00	29	0.14	0.07	0.07	2998.	1.05	8.00	104	0.00	0.00	0.00	478.
1.02	6.00	30	0.14	0.07	0.07	2831.	1.05	9.00	105	0.00	0.00	0.00	465.
1.02	7.00	31	0.49	0.42	0.07	2746.	1.05	10.00	106	0.00	0.00	0.00	453.
1.02	8.00	32	0.49	0.42	0.07	2823.	1.05	11.00	107	0.00	0.00	0.00	442.
1.02	9.00	33	0.49	0.42	0.07	3096.	1.05	12.00	108	0.00	0.00	0.00	430.
1.02	10.00	34	0.49	0.42	0.07	3576.	1.05	13.00	109	0.00	0.00	0.00	419.
1.02	11.00	35	0.49	0.42	0.07	4254.	1.05	14.00	110	0.00	0.00	0.00	408.
1.02	12.00	36	0.49	0.42	0.07	5127.	1.05	15.00	111	0.00	0.00	0.00	398.
1.02	13.00	37	0.76	0.69	0.06	6209.	1.05	16.00	112	0.00	0.00	0.00	387.
1.02	14.00	38	0.92	0.84	0.08	7531.	1.05	17.00	113	0.00	0.00	0.00	377.
1.02	15.00	39	1.14	1.07	0.08	9128.	1.05	18.00	114	0.00	0.00	0.00	368.
1.02	16.00	40	2.90	2.82	0.08	11221.	1.05	19.00	115	0.00	0.00	0.00	358.
1.02	17.00	41	1.07	0.99	0.08	13938.	1.05	20.00	116	0.00	0.00	0.00	349.
1.02	18.00	42	0.84	0.76	0.08	17089.	1.05	21.00	117	0.00	0.00	0.00	340.
1.02	19.00	43	0.21	0.14	0.07	20419.	1.05	22.00	118	0.00	0.00	0.00	331.
1.02	20.00	44	0.21	0.14	0.07	23664.	1.05	23.00	119	0.00	0.00	0.00	322.
1.02	21.00	45	0.21	0.14	0.07	26648.	1.06	0.00	120	0.00	0.00	0.00	314.
1.02	22.00	46	0.21	0.14	0.07	29260.	1.06	1.00	121	0.00	0.00	0.00	306.
1.02	23.00	47	0.21	0.14	0.07	31322.	1.06	2.00	122	0.00	0.00	0.00	298.
1.03	0.00	48	0.21	0.14	0.07	32673.	1.06	3.00	123	0.00	0.00	0.00	290.
1.03	1.00	49	0.01	0.00	0.01	33256.	1.06	4.00	124	0.00	0.00	0.00	283.
1.03	2.00	50	0.01	0.00	0.01	33045.	1.06	5.00	125	0.00	0.00	0.00	275.
1.03	3.00	51	0.01	0.00	0.01	32062.	1.06	6.00	126	0.00	0.00	0.00	268.
1.03	4.00	52	0.01	0.00	0.01	30343.	1.06	7.00	127	0.00	0.00	0.00	261.

1.03	5.00	53	0.01	0.00	0.01	27920.	1.06	8.00	128	0.00	0.00	0.00	255.
1.03	6.00	54	0.01	0.00	0.01	25121.	1.06	9.00	129	0.00	0.00	0.00	248.
1.03	7.00	55	0.04	0.00	0.04	22340.	1.06	10.00	130	0.00	0.00	0.00	242.
1.03	8.00	56	0.04	0.00	0.04	19740.	1.06	11.00	131	0.00	0.00	0.00	235.
1.03	9.00	57	0.04	0.00	0.04	17383.	1.06	12.00	132	0.00	0.00	0.00	229.
1.03	10.00	58	0.04	0.00	0.04	15251.	1.06	13.00	133	0.00	0.00	0.00	223.
1.03	11.00	59	0.04	0.00	0.04	13324.	1.06	14.00	134	0.00	0.00	0.00	217.
1.03	12.00	60	0.04	0.00	0.04	11581.	1.06	15.00	135	0.00	0.00	0.00	212.
1.03	13.00	61	0.07	0.00	0.07	10038.	1.06	16.00	136	0.00	0.00	0.00	206.
1.03	14.00	62	0.08	0.01	0.07	8687.	1.06	17.00	137	0.00	0.00	0.00	201.
1.03	15.00	63	0.10	0.03	0.07	7523.	1.06	18.00	138	0.00	0.00	0.00	196.
1.03	16.00	64	0.26	0.18	0.07	6542.	1.06	19.00	139	0.00	0.00	0.00	191.
1.03	17.00	65	0.09	0.02	0.07	5735.	1.06	20.00	140	0.00	0.00	0.00	186.
1.03	18.00	66	0.07	0.00	0.07	5070.	1.06	21.00	141	0.00	0.00	0.00	181.
1.03	19.00	67	0.02	0.00	0.02	4520.	1.06	22.00	142	0.00	0.00	0.00	176.
1.03	20.00	68	0.02	0.00	0.02	4063.	1.06	23.00	143	0.00	0.00	0.00	172.
1.03	21.00	69	0.02	0.00	0.02	3684.	1.07	0.00	144	0.00	0.00	0.00	167.
1.03	22.00	70	0.02	0.00	0.02	3367.	1.07	1.00	145	0.00	0.00	0.00	163.
1.03	23.00	71	0.02	0.00	0.02	3094.	1.07	2.00	146	0.00	0.00	0.00	159.
1.04	0.00	72	0.02	0.00	0.02	2845.	1.07	3.00	147	0.00	0.00	0.00	155.
1.04	1.00	73	0.00	0.00	0.00	2611.	1.07	4.00	148	0.00	0.00	0.00	151.
1.04	2.00	74	0.00	0.00	0.00	2389.	1.07	5.00	149	0.00	0.00	0.00	147.
1.04	3.00	75	0.00	0.00	0.00	2159.	1.07	6.00	150	0.00	0.00	0.00	143.

SUM 16.07 12.00 4.07 675000.
(408.)(305.)(103.)(19113.85)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	33256.	32026.	21453.	9045.	674858.
CMS	942.	907.	607.	256.	19110.
INCHES		3.55	9.50	12.02	12.46
MM		90.09	241.38	305.29	316.38
AC-FT		15881.	42551.	53819.	55773.
THOUS CU M		19589.	52486.	66385.	68795.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 1

24.	24.	23.	23.	22.	21.	21.	20.	20.	19.
19.	18.	19.	22.	32.	57.	105.	169.	244.	324.
405.	482.	548.	597.	629.	644.	644.	629.	600.	566.
549.	565.	620.	715.	851.	1025.	1242.	1506.	1826.	2244.
27[illegible].	3416.	4064.	4733.	5350.	5952.	6264.	6535.	6651.	6609.
6412.	6069.	5584.	5024.	4468.	3948.	3477.	3050.	2665.	2316.
2008.	1737.	1505.	1308.	1147.	1014.	904.	813.	737.	673.
619.	569.	522.	478.	432.	385.	337.	290.	248.	212.
179.	170.	166.	162.	157.	153.	149.	145.	142.	138.
134.	131.	128.	124.	121.	118.	115.	112.	109.	106.
103.	101.	98.	96.	93.	91.	88.	86.	84.	82.
80.	77.	75.	74.	72.	70.	68.	66.	64.	63.
61.	60.	58.	57.	55.	54.	52.	51.	50.	48.
47.	46.	45.	43.	42.	41.	40.	39.	38.	37.
36.	35.	34.	33.	33.	32.	31.	30.	29.	29.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6651.	6405.	4291.	1809.	134971.
CMS	188.	181.	121.	51.	3822.
INCHES		0.71	1.90	2.40	2.49
MM		18.02	48.28	61.06	63.28
AC-FT		3176.	8510.	10764.	11155.
THOUS CU M		3918.	10497.	13277.	13759.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 2

49.	47.	46.	45.	44.	43.	42.	41.	39.	38.
37.	36.	37.	44.	63.	114.	209.	338.	488.	648.
809.	963.	1096.	1194.	1257.	1288.	1288.	1258.	1199.	1132.
1098.	1129.	1239.	1430.	1702.	2651.	2484.	3013.	3657.	4489.
5575.	6836.	8166.	9465.	10659.	11704.	12529.	13069.	13302.	13218.
12625.	12137.	11166.	10048.	8936.	7896.	6953.	6100.	5330.	4633.
4015.	3475.	3009.	2617.	2294.	2028.	1808.	1625.	1473.	1347.
1239.	1138.	1044.	955.	864.	771.	674.	579.	496.	424.
357.	340.	332.	323.	315.	306.	299.	291.	283.	276.
269.	262.	255.	248.	242.	236.	230.	224.	218.	212.
207.	201.	196.	191.	186.	181.	177.	172.	168.	163.
159.	155.	151.	147.	143.	140.	136.	132.	129.	126.
122.	119.	116.	113.	110.	107.	105.	102.	99.	97.
94.	92.	89.	87.	85.	83.	80.	78.	76.	74.
72.	71.	69.	67.	65.	63.	62.	60.	59.	57.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13302.	12811.	8561.	3618.	269943.
CMS	377.	363.	243.	102.	7644.
INCHES		1.42	3.80	4.81	4.98
MM		36.03	96.55	122.12	126.55
AC-FT		6352.	17021.	21528.	22309.
THOUS CU M		7835.	20995.	26554.	27518.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 3

61.	59.	58.	56.	55.	53.	52.	51.	49.	48.
47.	46.	46.	55.	79.	143.	262.	423.	610.	810.
1012.	1204.	1369.	1493.	1572.	1610.	1610.	1573.	1499.	1415.
1373.	1412.	1549.	1788.	2127.	2563.	3104.	3766.	4564.	5611.
6969.	8545.	10209.	11832.	13324.	14630.	15661.	16337.	16628.	16522.
16031.	15171.	13960.	12560.	11170.	9870.	8651.	7625.	6662.	5791.
5019.	4343.	3762.	3271.	2867.	2535.	2260.	2032.	1842.	1684.
1547.	1422.	1306.	1194.	1079.	964.	842.	724.	620.	530.
447.	426.	414.	404.	393.	383.	373.	364.	354.	345.
336.	327.	319.	311.	303.	295.	287.	280.	272.	265.
258.	252.	245.	239.	233.	227.	221.	215.	210.	204.
199.	194.	189.	184.	179.	174.	170.	165.	161.	157.
153.	149.	145.	141.	138.	134.	131.	127.	124.	121.
118.	115.	112.	109.	106.	103.	101.	98.	95.	93.
90.	88.	86.	84.	81.	79.	77.	75.	73.	71.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16628.	16013.	10727.	4522.	337429.
CMS	471.	453.	304.	128.	9555.
INCHES		1.77	4.75	6.01	6.23
MM		45.04	120.69	152.65	158.19
AC-FT		7940.	21276.	26910.	27887.
THOUS CU M		9794.	26243.	33192.	34398.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 4

73.	71.	69.	68.	66.	64.	62.	61.	59.	58.
56.	55.	56.	66.	95.	171.	314.	508.	733.	972.
1214.	1445.	1643.	1791.	1886.	1932.	1932.	1887.	1759.	1699.
1645.	1694.	1859.	2145.	2553.	3076.	3725.	4519.	5477.	6733.
8363.	10254.	12251.	14198.	15989.	17556.	18793.	19604.	19954.	19827.
19237.	18265.	16752.	15072.	13404.	11844.	10430.	9150.	7995.	6949.
6023.	5212.	4514.	3925.	3441.	3042.	2712.	2438.	2210.	2020.
1856.	1707.	1567.	1433.	1295.	1156.	1011.	869.	744.	636.
536.	511.	497.	485.	472.	460.	448.	436.	425.	414.
403.	393.	383.	373.	363.	354.	344.	336.	327.	318.
310.	302.	294.	287.	279.	272.	265.	258.	251.	245.
239.	232.	226.	221.	215.	209.	204.	199.	193.	188.
184.	179.	174.	170.	165.	161.	157.	153.	149.	145.
141.	138.	134.	130.	127.	124.	121.	117.	114.	111.
109.	106.	103.	100.	98.	95.	93.	90.	88.	86.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	19954.	19216.	12872.	5427.	404915.
CMS	565.	544.	364.	154.	11466.
INCHES		2.13	5.70	7.21	7.47
MM		54.05	144.83	183.18	189.83
AC-FT		9529.	25531.	32291.	33464.
THOUS CU M		11753.	31492.	39831.	41277.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 5

97.	95.	92.	90.	88.	85.	83.	81.	79.	77.
75.	73.	74.	88.	126.	228.	419.	677.	977.	1296.
1619.	1926.	2191.	2388.	2515.	2576.	2576.	2516.	2398.	2265.
2197.	2259.	2476.	2861.	3403.	4101.	4967.	6025.	7302.	8977.
11151.	13672.	16335.	18931.	21318.	23408.	25057.	26139.	26605.	26436.
25649.	24274.	22336.	20097.	17872.	15792.	13906.	12200.	10680.	9265.
8031.	6950.	6019.	5234.	4588.	4056.	3616.	3251.	2947.	2694.
2475.	2276.	2089.	1911.	1727.	1542.	1348.	1158.	992.	847.
715.	681.	663.	646.	629.	613.	597.	582.	567.	552.
538.	524.	510.	497.	484.	472.	459.	447.	436.	425.
414.	403.	392.	382.	372.	363.	353.	344.	335.	327.
318.	310.	302.	294.	285.	279.	272.	265.	258.	251.
245.	238.	232.	226.	220.	215.	209.	204.	198.	193.
188.	183.	179.	174.	169.	165.	161.	157.	153.	149.
144.	141.	137.	134.	130.	127.	124.	121.	117.	114.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26605.	25621.	17162.	7236.	539885.
CMS	753.	726.	486.	205.	15288.
INCHES		2.84	7.60	9.62	9.96
MM		72.07	193.10	244.23	253.10
AC-FT		12705.	34041.	43055.	44619.
THOUS CU M		15671.	41989.	53108.	55036.

HYDROGRAPH AT STA 23 FOR PLAN 1, RTIO 6

122.	119.	116.	113.	110.	107.	104.	101.	99.	96.
94.	91.	93.	110.	156.	285.	523.	846.	1221.	1621.
2023.	2408.	2739.	2986.	3143.	3220.	3219.	3145.	2958.	2831.
2746.	2823.	3098.	3576.	4254.	5127.	6209.	7531.	9128.	11221.
13930.	17089.	20419.	23664.	26648.	29260.	31322.	32673.	33256.	33045.
32062.	30342.	27920.	25121.	22340.	19740.	17383.	15251.	13324.	11581.
10038.	8687.	7523.	6542.	5735.	5070.	4520.	4063.	3684.	3367.
3094.	2845.	2611.	2389.	2159.	1927.	1685.	1448.	1240.	1059.
893.	851.	829.	808.	787.	766.	746.	727.	708.	690.
672.	655.	638.	621.	605.	589.	574.	559.	545.	531.
517.	504.	491.	478.	465.	453.	442.	430.	419.	408.
398.	387.	377.	368.	358.	349.	340.	331.	322.	314.
306.	298.	290.	283.	275.	268.	261.	255.	248.	242.
235.	229.	223.	217.	212.	206.	201.	196.	191.	186.
181.	176.	172.	167.	163.	159.	155.	151.	147.	143.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	33256.	32026.	21453.	9045.	674858.
CMS	942.	907.	607.	256.	19110.
INCHES		3.55	9.50	12.02	12.46
MM		90.09	241.38	305.29	316.38
AC-FT		15881.	42551.	53819.	55773.
THOUS CU M		19589.	52486.	66385.	68795.

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COMBINE HYDROGRAPHS

61 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW CAYADUTTA CREEK

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1C23	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

62 CHANNEL ROUTE - MOHAWK RIVER BELOW SCHOHARIE CREEK

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

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   1029        1        0        0        0        0        1        0        0
                           ROUTING DATA
 QLOSS     CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
   0.0     0.000     0.00        0        1        0        0                 0

           NSTPS     NSTDL     LAG    AMSKK        X      TSK    STORA   ISPRAT
               1         0       0    2.500    0.200    0.000      0.        0

**********      **********      **********      **********      **********

                      SUB-AREA RUNOFF COMPUTATION

63 SUB AREA-24   RUNOFF
           ISTAQ     ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE   IAUTO
              24         0        0        0        0        0        1        0       0

                               HYDROGRAPH DATA
  IHYDG     IUHG     TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
      1        0     39.30     0.00  3456.00     0.00    0.000        0        1        0

                                 PRECIP DATA
              SPFE      PMS       R6      R12      R24      R48      R72      R96
              0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                  LOSS DATA
   LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
       0     0.07     2.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                           UNIT HYDROGRAPH DATA
                     TC= 11.12      R=  6.63      NTA=  0

                               RECESSION DATA
                STRTQ=    51.00     QRCSN=   420.00     RTIOR= 1.30

      UNIT HYDROGRAPH 42 END-OF-PERIOD ORDINATES, LAG=   9.36 HOURS, CP= 0.70   VOL= 1.00
     69.      250.      499.      780.     1076.     1375.     1635.     1817.     1920.     1944.
   1870.     1695.     1460.     1255.     1079.      928.      798.      686.      590.      507.
    436.      375.      322.      277.      238.      205.      176.      151.      130.      112.
     96.       83.       71.       61.       53.       45.       39.       33.       29.       25.
     21.       18.

                                END-OF-PERIOD FLOW
    0
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                               SUM  16.07  11.62   4.45   306584.
                                                                   ( 408.)( 295.)( 113.)( 8681.48)

**********      **********      **********      **********      **********
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HYDROGRAPH ROUTING

64 CHANNEL ROUTE - BATAVIA KILL AT WINDHAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1025	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	0	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	1.300	0.300	0.000	0.	0

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

65 SUB AREA-25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	0	186.50	0.00	3465.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.90	37.50	52.00	62.50	73.50	79.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.929

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.07	2.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

UNIT HYDROGRAPH DATA

TC= 16.24 R= 8.22 NTA= 0

RECESSION DATA

STRTQ= 320.00 QRCSN= 2500.00 RTIOR= 1.30

UNIT HYDROGRAPH 53 END-OF-PERIOD ORDINATES, LAG= 13.45 HOURS, CP= 0.74 VOL= 1.00

149.	554.	1115.	1758.	2449.	3166.	3897.	4632.	5334.	5924.
6361.	6653.	6809.	6830.	6710.	6422.	5892.	5234.	4633.	4102.
3632.	3215.	2846.	2520.	2231.	1975.	1749.	1548.	1371.	1213.
1074.	951.	842.	745.	660.	584.	517.	458.	405.	359.
318.	281.	249.	221.	195.	173.	153.	135.	120.	106.
94.	83.	74.							

0

END-OF-PERIOD FLOW

MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q MO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

```
                                                          SUM  16.07  11.62   4.45 1465833.
                                                              ( 408.)( 295.)( 113.)(41507.73)

   **********        **********        **********        **********        **********

                              COMBINE HYDROGRAPHS

           66 COMBINE HYDROGRAPHS AT BATAVIA KILL AT WINDHAM
                 ISTAQ    ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                  1025        2       0       0       0       0       1       0       0

   **********        **********        **********        **********        **********

                              SUB-AREA RUNOFF COMPUTATION

           67 SUB AREA-26
                 ISTAQ    ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    26        0       0       0       0       0       1       0       0

                                  HYDROGRAPH DATA
        IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
            1       0   10.20    0.00 3456.00    0.00   0.000       0       1       0

                                  PRECIP DATA
              SPFE     PMS      R6     R12     R24     R48     R72     R96
              0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                   LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
         0    0.07    1.50    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                              UNIT HYDROGRAPH DATA
                        TC=  7.65     R=  4.73     NTA=  0

                                 RECESSION DATA
                     STRTQ=    10.00    QRCSN=   70.00    RTIOR= 1.30

     UNIT HYDROGRAPH 30 END-OF-PERIOD ORDINATES, LAG=   6.32 HOURS, CP= 0.65  VOL= 1.00
        42.      153.      300.      460.      601.      690.      717.      669.      563.      456.
       369.      298.      241.      195.      158.      128.      103.       83.       67.       55.
        44.       36.       29.       23.       19.       15.       12.       10.        8.        7.

     0                              END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                          SUM  16.07  11.82   4.25   79783.
                                                              ( 408.)( 300.)( 108.)( 2259.20)
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**********          **********          **********          **********          **********

                              COMBINE HYDROGRAPHS

           68 COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK AT PRATTSVILLE (USGS 3500)
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                   1026       2       0       0       0       0       1       0       0

**********          **********          **********          **********          **********

                              SUB-AREA RUNOFF COMPUTATION

           69 SUB AREA-127    RUNOFF
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    127       0       0       0       0       0       1       0       0

                              HYDROGRAPH DATA
         IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
             1       0   78.00    0.00 3456.00    0.00   0.000       0       1       0

                              PRECIP DATA
              SPFE     PMS      R6     R12     R24     R48     R72     R96
              0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                              LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.07    1.50    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                              UNIT HYDROGRAPH DATA
                        TC= 12.96     R= 6.94     NTA= 0

                              RECESSION DATA
                   STRTQ=  115.00    QRCSN=  800.00    RTIOR= 1.30

         UNIT HYDROGRAPH 44 END-OF-PERIOD ORDINATES, LAG=  10.92 HOURS, CP= 0.74   VOL= 1.00
        162.       379.       758.      1186.      1640.      2106.      2567.      2965.      3250.      3423.
       3429.      3446.      3264.      2922.      2529.      2189.      1895.      1640.      1420.      1229.
       1064.       921.       797.       690.       597.       517.       447.       387.       335.       290.
        251.       217.       188.       163.       141.       122.       106.        91.        79.        69.
         59.        51.        44.        38.

        0                                END-OF-PERIOD FLOW
  MO.DA   HR.MN  PERIOD    RAIN    EXCS    LOSS    COMP Q       MO.DA   HR.MN  PERIOD    RAIN    EXCS    LOSS    COMP Q

                                                                          SUM  16.07   11.82    4.25   617686.
                                                                             ( 408.)( 300.)( 108.)(17490.90)
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 **********          **********          **********          **********          **********

                                 COMBINE HYDROGRAPHS

 70 COMBINE 2 HYDROGRAPHS AT SCHOHARIE RESERVOIR AT GILBOA DAM
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
          10127       2       0       0       0       0       1       0       0

 **********          **********          **********          **********          **********

                                 HYDROGRAPH ROUTING

 70(A) ROUTE OVER GILBOA DAM
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
          10127       1       0       0       0       0       1       0       0
                               ROUTING DATA
 QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
   0.0    0.000    0.00       1       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              1       0       0   0.000   0.000   0.000  60660.       0

STORAGE   15530.00   30680.00   49120.00   55260.00   60660.00   61750.00   62840.00   63920.00   65010.00

OUTFLOW       0.00       0.00       0.00       0.00       0.00    3480.00    9890.00   18160.00   27960.00

 **********          **********          **********          **********          **********

                                 HYDROGRAPH ROUTING

 71 CHANNEL ROUTE - SCHOHARIE CREEK BELOW COBLESKILL CREEK
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
           1027       1       0       0       0       0       1       0       0
                               ROUTING DATA
 QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
   0.0    0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              4       0       0   1.400   0.300   0.000      0.       0


 **********          **********          **********          **********          **********

                             SUB-AREA RUNOFF COMPUTATION

 72 SUB AREA-27  RUNOFF
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             27       0       0       0       0       0       1       0       0
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                                   HYDROGRAPH DATA
      IHYDG   IUHG   TAREA    SNAF   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
          1      0  491.00    0.00 3456.00    0.00   0.000       0       1       0

                                    PRECIP DATA
             SPFE     PMS      R6     R12     R24     R48     R72     R96
             0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                     LOSS DATA
   LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
       0   0.07   1.25   1.00   0.00   0.00   1.00   0.00   0.00   0.00   0.00

                               UNIT HYDROGRAPH DATA
                          TC= 20.79    R= 9.87    NTA= 0

                                  RECESSION DATA
                   STRTQ= 1010.00    QRCSN= 6800.00    RTIOR= 1.30

     UNIT HYDROGRAPH 64 END-OF-PERIOD ORDINATES, LAG= 17.22 HOURS, CP= 0.76  VOL= 1.00
      228.     850.    1724.    2736.    3835.    4991.    6182.    7392.    8611.    9830.
    11023.   12089.   12948.   13606.   14073.   14358.   14467.   14398.   14145.   13683.
    12909.   11624.   10664.    9654.    8723.    7881.    7121.    6435.    5814.    5254.
     4747.    4289.    3876.    3502.    3164.    2859.    2583.    2334.    2109.    1906.
     1722.    1556.    1406.    1270.    1148.    1037.     937.     847.     765.     691.
      625.     564.     510.     461.     416.     376.     340.     307.     278.     251.
      227.     205.     185.     167.

     0                               END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                              SUM  16.07  11.92   4.15  3945252.
                                                                 ( 408.)( 303.)( 106.)(111716.)

         ..........      ..........      ..........      ..........      ..........

                                COMBINE HYDROGRAPHS

          73 COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK BELOW COBLESKILL CREEK
                   ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
                    1027       2       0       0      0      0       1       0      0

         ..........      ..........      ..........      ..........      ..........

                                HYDROGRAPH ROUTING

          74 CHANNEL ROUTE - SCHOHARIE CREEK AT BURTONSVILLE (USGS 3515)
                   ISTAQ   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME  ISTAGE  IAUTO
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```
          1028        1        0        0        0        0        1        0        0
                                  ROUTING DATA
     QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
       0.0    0.000     0.00        0        1        0        0                 0

             NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                 1        0        0    1.200    0.200    0.000       0.        0

  **********     **********     **********     **********     **********

                           SUB-AREA RUNOFF COMPUTATION

     75 SUB AREA - 26  RUNOFF
             ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                28        0        0        0        0        0        1        0        0

                                 HYDROGRAPH DATA
      IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
          1        0    78.00     0.00  3456.00     0.00    0.000        0        1        0

                                   PRECIP DATA
               SPFE      PMS       R6      R12      R24      R48      R72      R96
               0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                    LOSS DATA
     LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
         0     0.07     1.25     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                              UNIT HYDROGRAPH DATA
                         TC= 12.75      R=  6.59     NTA=  0

                                 RECESSION DATA
                  STRTQ=  115.00     QRCSN=  800.00     RTIOR= 1.30

      UNIT HYDROGRAPH 42 END-OF-PERIOD ORDINATES, LAG=  10.51 HOURS, CP= 0.74   VOL= 1.00
      110.       406.       812.      1267.      1748.      2239.      2720.      3123.      3402.      3561.
     3604.      3526.      3264.      2892.      2465.      2134.      1833.      1575.      1352.      1162.
      998.       857.       736.       632.       543.       467.       401.       344.       296.       254.
      218.       187.       161.       138.       119.       102.        88.        75.        65.        56.
       48.        41.

        0                                END-OF-PERIOD FLOW
 MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS     COMP Q      MO.DA   HR.MN   PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                           SUM   16.07   11.92    4.15   622578.
                                                                               ( 408.)( 303.)( 106.)(17629.43)

  **********     **********     **********     **********     **********
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                              COMBINE HYDROGRAPHS

 76  COMBINE 2 HYDROGRAPHS AT SCHOHARIE CREEK AT BURTONSVILLE (USGS 3515)
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
           1028       2       0       0       0       0       1       0       0

**********      **********      **********      **********      **********

                              HYDROGRAPH ROUTING

 77 CHANNEL ROUTE - MOHAWK RIVER BELOW SCHOHARIE CREEK
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
           1029       1       0       0       0       0       1       0       0
                              ROUTING DATA
  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
    0.0   0.000    0.00       0       1       0       0               0

          NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
              1       0       0   2.100   0.200   0.000      0.       0

**********      **********      **********      **********      **********

                           SUB-AREA RUNOFF COMPUTATION

 78  SUB AREA - 29  RUNOFF
          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
             29       0       0       0       0       0       1       0       0

                              HYDROGRAPH DATA
 IHYDG   IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
     1      0   87.00    0.00 3456.00    0.00   0.000       0       1       0

                              PRECIP DATA
        SPFE     PMS      R6     R12     R24     R48     R72     R96
        0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                              LOSS DATA
  LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
      0   0.07   1.10   1.00   0.00   0.00   1.00   0.00   0.00   0.00   0.00

                           UNIT HYDROGRAPH DATA
                    TC= 13.13     R=  6.75     NTA=  0

                              RECESSION DATA
              STRTQ=  132.00    QRCSN=  920.00    RTIOR= 1.30
```

```
            UNIT HYDROGRAPH 44 END-OF-PERIOD ORDINATES, LAG= 11.00 HOURS, CP= 0.75  VOL= 1.00
      115.       425.       849.      1327.      1832.      2350.      2864.      3311.      3635.      3833.
     3912.      3872.      3690.      3319.      2867.      2471.      2130.      1837.      1583.      1365.
     1177.      1014.       874.       754.       650.       560.       483.       416.       359.       309.
      267.       230.       198.       171.       147.       127.       109.        94.        81.        70.
       60.        52.        45.        39.

     0                                        END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                       SUM  16.07  11.97   4.10   698533.
                                                                          ( 408.)( 304.)( 104.)(19780.23)

      **********         **********         **********         **********         **********

                                          COMBINE HYDROGRAPHS

            79 COMBINE 3 HYDROGRAPHS AT MOHAWK RIVER BELOW SCHOHARIE CREEK
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1029        3        0        0        0        0        1        0        0

      **********         **********         **********         **********         **********

                                          HYDROGRAPH ROUTING

            80 CHANNEL ROUTE - MOHAWK RIVER AT AMSTERDAM
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1030        1        0        0        0        0        1        0        0
                                                ROUTING DATA
              QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                0.0    0.000     0.00        0        1        0        0                 0

                        NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                            1        0        0    2.100    0.200    0.000       0.        0

      **********         **********         **********         **********         **********

                                        SUB-AREA RUNOFF COMPUTATION

            81 SUB AREA-30  RUNOFF
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                           30        0        0        0        0        0        1        0        0
                                              HYDROGRAPH DATA
          IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
              1        0   163.00     0.00  3456.00     0.00    0.000        0        1        0

                                                PRECIP DATA
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```
                SPFE      PMS       R6       R12       R24       R48       R72       R96
                0.00     21.90    37.50     52.00     62.50     73.50     79.00      0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                        LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
             0     0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                   UNIT HYDROGRAPH DATA
                              TC= 15.61     R= 11.14     NTA=  0

                                      RECESSION DATA
                           STRTQ=  160.00     QRCSN= 1150.00     RTIOR= 1.30

         UNIT HYDROGRAPH 68 END-OF-PERIOD ORDINATES, LAG=  13.78 HOURS, CP= 0.67  VOL= 1.00
      65.      245.      495.      794.     1117.     1460.     1815.     2177.     2520.     2807.
    3031.     3191.     3289.     3321.     3281.     3132.     2895.     2646.     2419.     2211.
    2021.     1847.     1689.     1543.     1411.     1290.     1179.     1078.      985.      900.
     823.      752.      688.      629.      575.      525.      480.      439.      401.      367.
     335.      306.      280.      256.      234.      214.      196.      179.      163.      149.
     137.      125.      114.      104.       95.       87.       80.       73.       67.       61.
      56.       51.       46.       42.       39.       35.       32.       30.
   0                                END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                     SUM  16.07  12.00   4.07   823683.
                                                                         ( 408.)( 305.)( 103.)(23324.08)


        **********         **********         **********         **********         **********

                                    COMBINE HYDROGRAPHS

             82 COMBINE 2  HYDROGRAPHS AT MOHAWK RIVER AT AMSTERDAM
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       1030       2       0       0       0       0       1       0       0


        **********         **********         **********         **********         **********

                                    HYDROGRAPH ROUTING

             83 CHANNEL ROUTE - MOHAWK RIVER AT CRANESVILLE
                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       1031       1       0       0       0       0       1       0       0
                                         ROUTING DATA
             QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
               0.0    0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
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                 1         0         0    1.300    0.200    0.000        0.         0

     **********          **********          **********          **********          **********

                                   SUB-AREA RUNOFF COMPUTATION

                   84 SUB AREA-31  RUNOFF
                              ISTAQ     ICOMP     IECON     ITAPE      JPLT      JPRT     INAME    ISTAGE     IAUTO
                                 31         0         0         0         0         0         1         0         0

                                                  HYDROGRAPH DATA
                   IHYDG      IUHG     TAREA      SNAP     TRSDA     TRSPC     RATIO     ISNOW     ISAME     LOCAL
                       1         0     26.00      0.00   3456.00      0.00     0.000         0         1         0

                                                   PRECIP DATA
                              SPFE       PMS        R6       R12       R24       R48       R72       R96
                              0.00     21.90     37.50     52.00     62.50     73.50     79.00      0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                                    LOSS DATA
             LROPT     STRKR     DLTKR     RTIOL     ERAIN     STRKS     RTIOK     STRTL     CNSTL     ALSMX     RTIMP
                 0      0.07      1.00      1.00      0.00      0.00      1.00      0.00      0.00      0.00      0.00

                                               UNIT HYDROGRAPH DATA
                                        TC=  9.98      R=  5.79      NTA=  0

                                                  RECESSION DATA
                                STRTQ=    34.00     QRCSN=   100.00     RTIOR=  1.30

                UNIT HYDROGRAPH 37 END-OF-PERIOD ORDINATES, LAG=   8.31 HOURS, CP= 0.71  VOL= 1.00
          64.        236.        469.        727.        997.       1248.       1434.       1538.       1562.       1493.
        1318.       1109.        932.        784.        659.        555.        466.        392.        330.        277.
         233.        196.        165.        139.        117.         98.         83.         69.         58.         49.
          41.         35.         29.         25.         21.         17.         15.

         0                                     END-OF-PERIOD FLOW
    MO.DA   HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q        MO.DA   HR.MN  PERIOD    RAIN    EXCS    LOSS     COMP Q

                                                                                      SUM   16.07   12.00    4.07   219423.
                                                                                          ( 408.)( 305.)( 103.)( 6214.02)

     **********          **********          **********          **********          **********

                                           COMBINE HYDROGRAPHS

                   85 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT CRANESVILLE
                              ISTAQ     ICOMP     IECON     ITAPE      JPLT      JPRT     INAME    ISTAGE     IAUTO
                               1031         2         0         0         0         0         1         0         0
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**********          **********          **********          **********          **********

                              HYDROGRAPH ROUTING

        86 CHANNEL ROUTE - MOHAWK RIVER AT ROTTERDAM JUNCTION
                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                 1032       1       0       0       0       0       1       0       0
                                  ROUTING DATA
         QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP           LSTR
           0.0   0.000    0.00       0       1       0       0              0

                NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                    1       0       0   2.100   0.200   0.000      0.       0


**********          **********          **********          **********          **********

                           SUB-AREA RUNOFF COMPUTATION

        87 SUB AREA-32   RUNOFF
                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                   32       0       0       0       0       0       1       0       0

                                 HYDROGRAPH DATA
       IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
           1       0   32.00    0.00 3456.00    0.00   0.000       0       1       0

                                   PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                    LOSS DATA
      LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                               UNIT HYDROGRAPH DATA
                      TC= 11.69      R= 10.19     NTA=  0

                                  RECESSION DATA
                 STRTQ=   40.00      QRCSN=  350.00      RTIOR= 1.30

        UNIT HYDROGRAPH 61 END-OF-PERIOD ORDINATES, LAG=  10.45 HOURS, CP= 0.61   VOL= 1.00
      34.      128.      259.      411.      577.      752.      918.     1054.     1151.     1211.
    1229.     1169.     1097.      994.      901.      817.      741.      671.      609.      552.
     500.      453.      411.      372.      338.      306.      277.      251.      228.      207.
     187.      170.      154.      139.      126.      115.      104.       94.       85.       77.
      70.       64.       58.       52.       47.       43.       39.       35.       32.       29.
      26.       24.       22.       20.       18.       16.       15.       13.       12.       11.
      10.
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                                                    END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q        MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                         SUM  16.07  12.00   4.07  256081.
                                                                            ( 408.)( 305.)( 103.)( 7251.4)

          **********        **********        **********        **********        **********

                                          COMBINE HYDROGRAPHS

                  68 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT ROTTERDAM JUNCTION
                         ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                          1032        2        0        0        0        0        1        0        0

          **********        **********        **********        **********        **********

                                          HYDROGRAPH ROUTING

                  69 CHANNEL ROUTE - MOHAWK RIVER AT SCHENECTADY
                         ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                          1033        1        0        0        0        0        1        0        0
                                               ROUTING DATA
                  QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP             LSTR
                    0.0    0.000     0.00        0        1        0        0                0

                         NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                             2        0        0    1.500    0.200    0.000       0.        0

          **********        **********        **********        **********        **********

                                       SUB-AREA RUNOFF COMPUTATION

                  90 SUB AREA-33  RUNOFF
                         ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                            33        0        0        0        0        0        1        0        0
                                              HYDROGRAPH DATA
              IHYDG    IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                  1       0    38.00     0.00  3456.00     0.00    0.000        0        1        0
                                                PRECIP DATA
                     SPFE      PMS       R6      R12      R24      R48      R72      R96
                     0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929
                                                LOSS DATA
             LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
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      0     0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                    UNIT HYDROGRAPH DATA
                              TC= 10.67     R=  5.89    NTA=  0

                                      RECESSION DATA
                         STRTQ=    49.00     QRCSN=  400.00     RTIOR= 1.30

          UNIT HYDROGRAPH 38 END-OF-PERIOD ORDINATES, LAG=   9.02 HOURS, CP= 0.73  VOL= 1.00
       78.      286.      568.      881.     1209.     1530.     1791.     1957.     2030.     2009.
     1862.     1614.     1361.     1148.      968.      817.      689.      581.      490.      414.
      349.      294.      248.      209.      177.      149.      126.      106.       89.       75.
       64.       54.       45.       38.       32.       27.       23.       19.

      0                                  END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                    SUM  16.07  12.00   4.07   305765.
                                                                       ( 408.)( 305.)( 103.)( 8658.29)

          **********          **********          **********          **********          **********

                                    COMBINE HYDROGRAPHS

                 91 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT SCHENECTADY
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1033        2        0        0        0        0        1        0        0

          **********          **********          **********          **********          **********

                                    HYDROGRAPH ROUTING

                 92 CHANNEL ROUTE - VISCHERS FERRY
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                         1034        1        0        0        0        0        1        0        0
                                                 ROUTING DATA
                 QLOSS    CLOSS      AVG     IRES    ISAME     IOPT     IPMP              LSTR
                   0.0    0.000     0.00        0        1        0        0                 0

                        NSTPS    NSTDL      LAG    AMSKK        X      TSK    STORA   ISPRAT
                            2        0        0    1.800    0.200    0.000       0.        0

          **********          **********          **********          **********          **********

                                 SUB-AREA RUNOFF COMPUTATION

                 93 SUB AREA-34 RUNOFF
                        ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
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              34        0        0        0        0        0        1        0        0

                                   HYDROGRAPH DATA
      IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
          1        0   108.00     0.00  3456.00     0.00    0.000        0        1        0

                                     PRECIP DATA
               SPFE      PMS       R6      R12      R24      R48      R72      R96
               0.00    21.90    37.50    52.00    62.50    73.50    79.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                      LOSS DATA
     LROPT    STRKR    DLTKR    RTIOL    ERAIN    STRKS    RTIOK    STRTL    CNSTL    ALSMX    RTIMP
         0     0.07     1.00     1.00     0.00     0.00     1.00     0.00     0.00     0.00     0.00

                                  UNIT HYDROGRAPH DATA
                             TC= 14.85      R=  8.81     NTA=  0

                                    RECESSION DATA
                      STRTQ=  170.00     QRCSN= 1250.00     RTIOR= 1.30

         UNIT HYDROGRAPH 55 END-OF-PERIOD ORDINATES, LAG=  12.65 HOURS, CP= 0.71   VOL= 1.00
      92.       344.       695.      1099.      1534.      1968.      2453.      2915.      3322.      3635.
    3855.      3983.      4021.      3962.      3769.      3436.      3067.      2738.      2444.      2181.
    1947.      1738.      1551.      1385.      1236.      1103.       985.       879.       784.       700.
     625.       558.       498.       444.       397.       354.       316.       282.       252.       225.
     201.       179.       160.       143.       127.       114.       101.        91.        81.        72.
      64.        57.        51.        46.        41.

      0                                END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM   16.07  12.00   4.07  868935.
                                                                              ( 408.)( 305.)( 103.)(24605.48)

          **********          **********          **********          **********          **********

                                   COMBINE HYDROGRAPHS

                 94 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT VISCHERS FERRY
                           ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
                              34        2        0        0        0        0        1        0        0

          **********          **********          **********          **********          **********

                                   HYDROGRAPH ROUTING

                 95 CHANNEL ROUTE -MOHAWK RIVER AT COHOES   (USGS 3575)
                           ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME   ISTAGE    IAUTO
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              1L35      1       0       0       0       0       1       0       0
                                    ROUTING DATA
       QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
         0.0   0.000    0.00       0       1       0       0               0

              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                  1       0       0   1.500   0.200   0.000      0.       0

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                        SUB-AREA RUNOFF COMPUTATION

      96 SUB AREA-35  RUNOFF
              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE  IAUTO
                 35       0       0       0       0       0       1       0      0

                                  HYDROGRAPH DATA
      IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
          1       0   33.00    0.00 3456.00    0.00   0.000       0       1       0

                                    PRECIP DATA
              SPFE     PMS      R6     R12     R24     R48     R72     R96
              0.00   21.90   37.50   52.00   62.50   73.50   79.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.929

                                     LOSS DATA
     LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
         0    0.07    1.00    1.00    0.00    0.00    1.00    0.00    0.00    0.00    0.00

                                UNIT HYDROGRAPH DATA
                          TC= 10.42     R=  5.98     NTA=  0

                                   RECESSION DATA
                      STRTQ=   41.00    QRCSN=  370.00    RTIOR= 1.30

       UNIT HYDROGRAPH 38 END-OF-PERIOD ORDINATES, LAG=   8.86 HOURS, CP= 0.73  VOL= 1.00
        69.     254.     504.     784.    1076.    1358.    1582.    1720.    1774.    1742.
      1590.    1363.    1153.     975.     824.     697.     590.     499.     422.     357.
       302.     255.     216.     182.     154.     130.     110.      93.      79.      67.
        56.      48.      40.      34.      29.      24.      21.      17.

      0                              END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                      SUM  16.07  12.00   4.07  266076.
                                                                        ( 408.)( 305.)( 103.)( 7534.43)

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COMBINE HYDROGRAPHS

92 COMBINE 2 HYDROGRAPHS AT MOHAWK RIVER AT CONOES (USGS 3575)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1035	2	0	0	0	0	1	0	0

....

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

				RATIOS APPLIED TO FLOWS					
OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
HYDROGRAPH AT	1	150.00	1	11124.	22247.	27809.	33371.	44494.	55618.
		(388.50)		(314.98)(	629.97)(	787.46)(	944.95)(	1259.93)(	1574.92)(
ROUTED TO	1001	150.00	1	5981.	13919.	17760.	21565.	29121.	36633.
		(388.50)		(169.37)(	394.13)(	502.90)(	610.65)(	824.60)(	1037.32)(
ROUTED TO	1022	150.00	1	5969.	13887.	17721.	21518.	29059.	36556.
		(388.50)		(169.01)(	393.23)(	501.79)(	609.33)(	822.86)(	1035.15)(
HYDROGRAPH AT	2	7.00	1	786.	1571.	1964.	2357.	3143.	3929.
		(18.13)		(22.25)(	44.50)(	55.62)(	66.75)(	89.00)(	111.25)(
2 COMBINED	1002	157.00	1	6029.	14048.	17922.	21761.	29382.	36960.
		(406.63)		(170.73)(	397.80)(	507.51)(	616.19)(	832.00)(	1046.58)(
ROUTED TO	1003	157.00	1	5971.	13921.	17763.	21569.	29126.	36639.
		(406.63)		(169.07)(	394.20)(	502.99)(	610.76)(	824.74)(	1037.49)(
HYDROGRAPH AT	3	289.00	1	17626.	35252.	44065.	52879.	70505.	88131.
		(748.50)		(499.12)(	998.23)(	1247.79)(	1497.35)(	1996.47)(	2495.58)(
2 COMBINED	1003	446.00	1	21041.	44563.	56371.	68118.	91510.	114822.
		(1155.13)		(595.83)(	1261.87)(	1596.25)(	1928.88)(	2591.28)(	3251.39)(
ROUTED TO	1004	446.00	1	20742.	43909.	55537.	67113.	90172.	113151.
		(1155.13)		(587.35)(	1243.36)(	1572.64)(	1900.43)(	2553.37)(	3204.08)(
HYDROGRAPH AT	4	93.00	1	6702.	13405.	16756.	20107.	26810.	33512.
		(240.87)		(189.79)(	379.59)(	474.48)(	569.38)(	759.17)(	948.96)(
2 COMBINED	1004	539.00	1	25589.	53113.	67103.	81061.	108886.	136626.
		(1395.99)		(724.59)(	1503.99)(	1900.14)(	2295.38)(	3083.30)(	3868.81)(
ROUTED TO	1005	539.00	1	24517.	51014.	64399.	77767.	104445.	131060.
		(1395.99)		(694.26)(	1444.56)(	1823.57)(	2202.12)(	2957.56)(	3711.20)(
HYDROGRAPH AT	5	156.00	1	9878.	19757.	24696.	29635.	39514.	49392.
		(409.22)		(279.73)(	559.45)(	699.32)(	839.18)(	1118.91)(	1398.63)(
2 COMBINED	1005	697.00	1	31462.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		(1205.21)		(890.90)(	1616.46)(	2266.95)(	2760.62)(	3704.23)(	4647.06)(
ROUTED TO	1010	697.00	1	31164.	63740.	80311.	96861.	129958.	163023.
		(1805.21)		(883.03)(	1806.32)(	2274.14)(	2742.79)(	3680.00)(	4616.28)(
HYDROGRAPH AT	6	375.00	1	17345.	34690.	43363.	52035.	69380.	86725.
		(971.24)		(491.16)(	982.31)(	1227.89)(	1473.47)(	1964.63)(	2455.79)(
ROUTED TO	1006	375.00	1	9219.	20148.	25537.	30902.	41604.	52264.
		(971.24)		(261.04)(	570.54)(	723.12)(	875.05)(	1178.11)(	1480.53)(
HYDROGRAPH AT	7	7.00	1	754.	1508.	1885.	2262.	3016.	3771.
		(18.13)		(21.35)(	42.71)(	53.38)(	64.06)(	85.42)(	106.77)(
2 COMBINED	1007	382.00	1	9241.	20202.	25604.	30985.	41726.	52436.
		(989.37)		(261.68)(	572.05)(	725.01)(	877.39)(	1181.55)(	1484.83)(
HYDROGRAPH AT	8	53.00	1	4535.	9071.	11339.	13606.	18142.	22677.
		(137.27)		(128.43)(	256.86)(	321.07)(	385.29)(	513.72)(	642.15)(
2 COMBINED	1008	435.00	1	9552.	20899.	26493.	32063.	43166.	54253.
		(1126.64)		(270.49)(	591.81)(	750.21)(	907.92)(	1222.39)(	1536.29)(
ROUTED TO	1009	435.00	1	9527.	20841.	26427.	31986.	43071.	54123.
		(1126.64)		(269.78)(	590.14)(	748.32)(	905.79)(	1219.63)(	1532.58)(
HYDROGRAPH AT	9	121.00	1	9296.	18591.	23239.	27887.	37182.	46478.
		(313.39)		(263.22)(	526.44)(	658.06)(	789.67)(	1052.89)(	1316.11)(
2 COMBINED	1009	556.00	1	15307.	31557.	39931.	48522.	65812.	83057.
		(1440.02)		(433.44)(	893.59)(	1130.71)(	1373.99)(	1863.56)(	2351.92)(
ROUTED TO	1010	556.00	1	15296.	31491.	39817.	48402.	65648.	82843.
		(1440.02)		(433.12)(	891.74)(	1127.48)(	1370.60)(	1858.94)(	2345.85)(
HYDROGRAPH AT	10	45.00	1	3843.	7685.	9607.	11528.	15370.	19213.
		(116.55)		(108.81)(	217.62)(	272.03)(	326.43)(	435.24)(	544.05)(
3 COMBINED	1010	1298.00	1	46213.	94756.	119745.	144782.	194834.	244826.
		(3361.78)		(1308.62)(	2683.19)(	3390.81)(	4099.76)(	5517.07)(	6932.29)(
ROUTED TO	1011	1298.00	1	45517.	93629.	118275.	142961.	192393.	241756.
		(3361.78)		(1288.89)(	2651.28)(	3349.16)(	4048.75)(	5447.95)(	6845.82)(
HYDROGRAPH AT	11	27.00	1	2529.	5058.	6322.	7586.	10115.	12644.
		(69.93)		(71.61)(	143.22)(	179.02)(	214.82)(	286.43)(	358.04)(
2 COMBINED	1011	1325.00	1	46253.	94865.	119820.	144834.	194865.	244848.
		(3431.71)		(1309.74)(	2686.28)(	3392.91)(	4101.25)(	5517.95)(	6933.21)(
ROUTED TO	1012	1325.00	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

		(3439.71)		(1298.25)	(2667.20)	(3366.64)	(4068.39)	(5473.39)	(6877.36)
HYDROGRAPH AT	12	23.00	1	2188.	4376.	5470.	6564.	8752.	10941.
		(59.57)		(61.96)	(123.92)	(154.90)	(185.88)	(247.84)	(309.80)
2 COMBINED	1012	1348.00	1	46262.	95021.	119922.	144913.	184939.	244945.
		(3491.28)		(1310.00)	(2690.70)	(3395.81)	(4103.48)	(5520.04)	(6936.07)
ROUTED TO	1015	1348.00	1	46152.	94851.	119712.	144660.	194596.	244813.
		(3491.28)		(1306.87)	(2685.88)	(3389.87)	(4096.32)	(5510.35)	(6923.80)
HYDROGRAPH AT	13	261.00	1	24547.	49095.	61368.	73642.	98190.	122737.
		(675.98)		(695.10)	(1390.21)	(1737.76)	(2085.31)	(2780.42)	(3475.52)
HYDROGRAPH AT	14	30.00	1	2791.	5581.	6976.	8372.	11162.	13953.
		(77.70)		(79.02)	(158.04)	(197.55)	(237.06)	(316.08)	(395.10)
2 COMBINED	1014	291.00	1	26576.	53148.	66435.	79722.	106296.	132871.
		(753.68)		(752.49)	(1504.99)	(1881.24)	(2257.48)	(3009.98)	(3762.47)
ROUTED TO	1014	291.00	1	16901.	33802.	42252.	50702.	67603.	84504.
		(753.68)		(478.58)	(957.16)	(1196.44)	(1435.73)	(1914.31)	(2392.89)
ROUTED TO	1015	291.00	1	16861.	33721.	42151.	50582.	67442.	84303.
		(753.68)		(477.44)	(954.88)	(1193.59)	(1432.31)	(1909.75)	(2387.19)
HYDROGRAPH AT	15	37.00	1	3341.	6682.	8353.	10023.	13365.	16706.
		(95.83)		(94.61)	(189.22)	(236.53)	(283.83)	(378.44)	(473.05)
3 COMBINED	1015	1676.00	1	63735.	129914.	163561.	197255.	264723.	332170.
		(4340.79)		(1804.77)	(3678.76)	(4630.97)	(5585.63)	(7496.10)	(9405.99)
ROUTED TO	1016	1676.00	1	62786.	127997.	161093.	194301.	260738.	327148.
		(4340.79)		(1777.90)	(3624.46)	(4561.65)	(5501.98)	(7383.28)	(9263.80)
HYDROGRAPH AT	16	151.00	1	6975.	13950.	17438.	20925.	27900.	34875.
		(391.09)		(197.51)	(395.02)	(493.78)	(592.53)	(790.04)	(987.55)
2 COMBINED	1016	1827.00	1	68354.	139049.	174883.	210810.	282731.	354656.
		(4731.88)		(1935.56)	(3937.44)	(4952.14)	(5969.47)	(8006.04)	(10042.72)
ROUTED TO	1018	1827.00	1	68197.	138775.	174534.	210385.	282157.	353933.
		(4731.88)		(1931.13)	(3929.66)	(4942.24)	(5957.44)	(7989.78)	(10022.27)
HYDROGRAPH AT	17	59.20	1	5022.	10043.	12554.	15065.	20087.	25109.
		(153.33)		(142.20)	(284.40)	(355.50)	(426.60)	(568.80)	(711.00)
HYDROGRAPH AT	18	13.10	1	1327.	2655.	3318.	3982.	5309.	6637.
		(33.93)		(37.59)	(75.17)	(93.97)	(112.76)	(150.34)	(187.93)
3 COMBINED	1018	1899.30	1	69272.	140612.	176819.	213128	285816	358564

		(4919.13)		(1961.56)	(3981.68)	(5006.96)	(6035.11)	(8093.33)	(10151.71)
ROUTED TO	1019	1855.30	1	65C40.	140296.	176409.	232618.	285115.	357626.
		(4919.13)		(1955.00)	(3972.72)	(4995.33)	(6020.86)	(8073.95)	(10126.82)
HYDROGRAPH AT	19	72.00	1	5965.	11929.	14912.	17864.	23859.	29824.
		(186.48)		(168.90)	(337.80)	(422.26)	(506.71)	(675.61)	(844.51)
2 COMBINED	1019	1921.30	1	70137.	142291.	178768.	215453.	288804.	362360.
		(5105.61)		(1988.04)	(4029.24)	(5062.98)	(6100.92)	(8180.56)	(10260.59)
ROUTED TO	1020	1871.30	1	66834.	141918.	178411.	215004.	288277.	361872.
		(5105.61)		(1980.30)	(4018.68)	(5052.04)	(6088.23)	(8163.08)	(10238.57)
HYDROGRAPH AT	20	55.00	1	4647.	9295.	11618.	13942.	18589.	23236.
		(142.45)		(131.60)	(263.19)	(328.99)	(394.79)	(526.38)	(657.98)
2 COMBINED	1020	2026.30	1	70607.	143182.	179886.	216768.	290630.	364513.
		(5248.06)		(1999.38)	(4054.46)	(5093.79)	(6138.19)	(8229.70)	(10321.84)
ROUTED TO	1023	2026.30	1	70005.	142034.	178531.	215123.	288397.	361659.
		(5248.06)		(1982.31)	(4021.94)	(5055.44)	(6091.61)	(8166.49)	(10242.18)
HYDROGRAPH AT	21	12.70	1	1176.	2353.	2941.	3529.	4705.	5882.
		(32.89)		(33.31)	(66.62)	(83.27)	(99.93)	(133.24)	(166.55)
HYDROGRAPH AT	22	23.00	1	2136.	4272.	5340.	6408.	8544.	10681.
		(59.57)		(60.49)	(120.98)	(151.22)	(181.46)	(241.95)	(302.44)
2 COMBINED	1022	35.70	1	3307.	6615.	8268.	9922.	13229.	16537.
		(92.46)		(93.65)	(187.31)	(234.13)	(280.96)	(374.61)	(468.27)
ROUTED TO	1023	35.70	1	3263.	6526.	8157.	9789.	13052.	16315.
		(92.46)		(92.40)	(184.80)	(230.99)	(277.19)	(369.59)	(461.99)
HYDROGRAPH AT	23	84.00	1	6651.	13302.	16628.	19954.	26605.	33256.
		(217.56)		(188.34)	(376.68)	(470.85)	(565.02)	(753.36)	(941.71)
3 COMBINED	1023	2146.00	1	71172.	144330.	181305.	218393.	292699.	367066.
		(5558.08)		(2015.36)	(4086.98)	(5133.98)	(6184.20)	(8288.30)	(10394.15)
ROUTED TO	1029	2146.00	1	70518.	143068.	179770.	216566.	290259.	363956.
		(5558.08)		(1996.85)	(4051.23)	(5090.50)	(6132.45)	(8219.21)	(10307.21)
HYDROGRAPH AT	24	39.30	1	3333.	6666.	8332.	9999.	13332.	16665.
		(101.79)		(94.38)	(188.76)	(235.94)	(283.13)	(377.51)	(471.89)
ROUTED TO	1025	39.30	1	3296.	6591.	8239.	9887.	13182.	16478.
		(101.79)		(93.32)	(186.64)	(233.30)	(279.96)	(373.28)	(466.60)
HYDROGRAPH AT	25	186.50	1	12804.	25609.	32011.	38413.	51217.	64021.

		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		(483.03)		(362.58)(	725.15)(	906.44)(	1087.73)(	1450.30)(	1812.88)(
2 COMBINED	1025	225.80	1	15961.	31922.	39903.	47884.	63845.	79806.
		(584.82)		(451.97)(	903.94)(	1129.93)(	1355.91)(	1807.89)(	2259.86)(
HYDROGRAPH AT	26	10.20	1	1087.	2175.	2719.	3262.	4350.	5437.
		(26.42)		(30.79)(	61.59)(	76.99)(	92.38)(	123.18)(	153.97)(
2 COMBINED	1026	236.00	1	16553.	33106.	41382.	49658.	66211.	82764.
		(611.23)		(468.72)(	937.44)(	1171.80)(	1406.16)(	1874.88)(	2343.60)(
HYDROGRAPH AT	127	78.00	1	6196.	12392.	15490.	18588.	24784.	30980.
		(202.02)		(175.45)(	350.90)(	438.63)(	526.35)(	701.81)(	877.26)(
2 COMBINED	10127	314.00	1	22695.	45390.	56738.	68085.	90780.	113475.
		(813.25)		(642.65)(	1285.30)(	1606.63)(	1927.96)(	2570.61)(	3213.26)(
ROUTED TO	10127	314.00	1	22247.	44750.	55940.	67129.	89506.	111883.
		(813.25)		(625.97)(	1267.18)(	1584.05)(	1900.89)(	2534.53)(	3168.17)(
ROUTED TO	1027	314.00	1	21588.	43412.	54276.	65136.	86851.	108565.
		(813.25)		(611.30)(	1229.28)(	1536.93)(	1844.44)(	2459.35)(	3074.21)(
HYDROGRAPH AT	27	491.00	1	28651.	57301.	71626.	85952.	114602.	143253.
		(1271.68)		(811.29)(	1622.58)(	2028.23)(	2433.88)(	3245.17)(	4056.46)(
2 COMBINED	1027	805.00	1	49680.	99790.	124761.	149722.	199636.	249547.
		(2084.93)		(1406.78)(	2825.74)(	3532.83)(	4239.65)(	5653.05)(	7066.37)(
ROUTED TO	1028	805.00	1	49364.	99212.	124047.	148865.	198503.	248132.
		(2084.93)		(1397.84)(	2809.36)(	3512.61)(	4215.50)(	5620.97)(	7026.30)(
HYDROGRAPH AT	28	78.00	1	6352.	12703.	15879.	19055.	25406.	31758.
		(202.02)		(179.86)(	359.71)(	449.64)(	539.57)(	719.42)(	899.28)(
2 COMBINED	1028	883.00	1	52436.	105537.	131980.	158401.	211221.	264033.
		(2286.94)		(1484.81)(	2988.48)(	3737.25)(	4485.40)(	5981.11)(	7476.57)(
ROUTED TO	1029	883.00	1	51621.	103856.	129900.	155920.	207931.	259929.
		(2286.94)		(1461.73)(	2940.87)(	3678.36)(	4415.15)(	5887.95)(	7360.35)(
HYDROGRAPH AT	29	87.00	1	6954.	13908.	17385.	20862.	27816.	34770.
		(225.33)		(196.91)(	393.83)(	492.29)(	590.74)(	787.66)(	984.57)(
3 COMBINED	1029	3116.00	1	112163.	224869.	281339.	337866.	451066.	564425.
		(8070.35)		(3176.09)(	6367.57)(	7966.62)(	9567.29)(	(12772.76)(	(15982.71)(
ROUTED TO	1030	3116.00	1	111293.	223167.	279225.	335339.	447763.	560323.
		(8070.35)		(3151.47)(	6319.39)(	7906.76)(	9495.73)(	(12679.23)(	(15866.25)(
HYDROGRAPH AT	[illegible]	[illegible]	1	[illegible]	12696.	15867.	19041.	25388.	31734.

		(2?6.77)		(179.72)(	359.45)(	449.31)(	539.17)(	718.90)(	898.62)(
2 COMBINED	1030	3219.00	1	114402.	229365.	286597.	344665.	460145.	575778.
		(8337.11)		(3239.50)(	6495.45)(	8126.83)(	9759.81)(13029.85)(		16304.21)(
ROUTED TO	1031	3219.00	1	114062.	228738.	286186.	343687.	458825.	574109.
		(8337.11)		(3229.86)(	6477.13)(	8103.87)(	9732.12)(	12992.47)(	16256.95)(
HYDROGRAPH AT	31	28.00	1	2584.	5169.	6461.	7753.	10338.	12922.
		(72.52)		(73.18)(	146.37)(	182.96)(	219.55)(	292.74)(	365.92)(
2 COMBINED	1031	3247.00	1	114303.	229221.	286790.	344411.	459791.	575317.
		(8409.63)		(3236.70)(	6490.81)(	8120.97)(	9752.64)(	13019.83)(	16291.15)(
ROUTED TO	1032	3247.00	1	113500.	227642.	284828.	342067.	456679.	571466.
		(8409.63)		(3213.96)(	6446.10)(	8065.43)(	9686.26)(	12931.69)(	16182.08)(
HYDROGRAPH AT	32	32.00	1	2227.	4455.	5568.	6682.	8909.	11136.
		(82.88)		(63.07)(	126.14)(	157.67)(	189.21)(	252.27)(	315.34)(
2 COMBINED	1032	3279.00	1	114069.	228781.	286251.	343775.	458956.	574278.
		(8492.51)		(3230.08)(	6478.34)(	8105.73)(	9734.62)(	12996.17)(	16261.72)(
ROUTED TO	1033	3279.00	1	113310.	227281.	284390.	341554.	456014.	570669.
		(8492.51)		(3208.57)(	6435.67)(	8053.02)(	9671.72)(	12912.87)(	16159.52)(
HYDROGRAPH AT	33	38.00	1	3401.	6802.	8502.	10202.	13603.	17004.
		(98.42)		(96.30)(	192.60)(	240.75)(	288.90)(	385.20)(	481.50)(
2 COMBINED	1033	3317.00	1	113533.	227727.	284947.	342223.	456906.	571727.
		(8590.93)		(3214.88)(	6448.51)(	8068.81)(	9690.67)(	12938.14)(	16189.48)(
ROUTED TO	1034	3317.00	1	112547.	225760.	282512.	339330.	453104.	567014.
		(8590.93)		(3186.99)(	6392.79)(	7999.85)(	9608.75)(	12830.47)(	16056.02)(
HYDROGRAPH AT	34	108.00	1	7479.	14959.	18698.	22438.	29917.	37396.
		(279.72)		(211.79)(	423.58)(	529.47)(	635.37)(	847.16)(	1058.95)(
2 COMBINED	34	3425.00	1	113601.	227867.	285147.	342491.	457319.	572282.
		(8870.65)		(3216.82)(	6452.47)(	8074.44)(	9698.26)(	12949.82)(	16205.20)(
ROUTED TO	1035	3425.00	1	113200.	227095.	284176.	341316.	455797.	570416.
		(8870.65)		(3205.47)(	6430.61)(	8046.96)(	9664.97)(	12906.72)(	16152.36)(
HYDROGRAPH AT	35	33.00	1	2964.	5927.	7409.	8891.	11854.	14818.
		(85.47)		(83.92)(	167.84)(	209.79)(	251.75)(	335.67)(	419.59)(
2 COMBINED	1035	3458.00	1	113322.	227348.	284492.	341694.	456228.	570946.
		(8956.12)		(3208.91)(	6437.76)(	8055.90)(	9675.70)(	12918.92)(	16167.37)(

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PROJECT NAME ______ DATE 8-21-79
SUBJECT Crescent Dam #2 PROJECT NO. ______
DRAWN BY JAG

Discharge - from 2 ogee crest spillways + flow over island

Dam A - Ogee crest - uncontrolled overflow
Length, L = 900' Crest Elev. = 184.0
Spillway Height, h ~ 35'
H.W. Elev. ~ 191 ∴ Assume $H_d \sim 7'$
Reference: Open-Channel Hydraulics - Chow
$C_d = 4.03$ $h/H_d = \frac{35}{7} = 5$

Elev.	H_e	H_e/H_d	C/C_d	C	$Q = CL\ H_e^{3/2}$
184	0'	0	—	—	—
186	2'	0.286	0.82	3.3	8,400 cfs
188	4	.571	.92	3.71	26,710
190	6	.857	.98	3.95	52,250
192	8	1.14	1.01	4.07	82,880
194	10	1.43	1.03	4.15	118,110
196	12	1.71	1.03	4.15	155,260
198	14	2.0	1.03	4.15	195,650
200	16	2.29	1.03	4.15	239,040
202	18	2.57	1.03	4.15	285,230
204	20	2.86	1.03	4.15	334,070
206	22	3.14	1.03	4.15	385,410
208	24	3.43	1.03	4.15	439,140
210	26	3.71	1.03	4.15	495,170

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DRAWN BY JAG

Dam B - Ogee Crest

$L = 586'$ $h \sim 14'$ Crest Elev = 184.0

$H_d \sim 7'$

$C_d = 4.03$ $h/H_d = \frac{14}{7} = 2.0$

Elev.	H_e	H_e/H_d	C/C_d	C	$Q = C L H_e^{3/2}$
184	0	—	—	—	—
186	2'	0.286	0.82	3.3	5,470 cfs
188	4	.571	.92	3.71	17,390
190	6	.857	.98	3.95	34,020
192	8	1.14	1.01	4.07	53,970
194	10	1.43	1.03	4.15	76,900
196	12	1.71	1.03	4.15	101,090
198	14	2.0	1.03	4.15	127,390
200	16	2.29	1.03	4.15	155,640
202	18	2.57	1.03	4.15	185,720
204	20	2.86	1.03	4.15	217,520
206	22	3.14	1.03	4.15	250,950
208	24	3.43	1.03	4.15	285,930

Flow over Island

Estimated using Mannings equation with an effective width of 300'. $S \sim .08$ from USGS Qua[d] $R \sim$ height of water. Assuming $n \sim 0.20$ due to trees e[tc]

Elev.	$H \sim R$	A	$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$
194	1'	300 ft²	630 cfs
196	3	900	3940
198	5	1500	9,240
200	7	2100	16,190
202	9	2700	24,620
204	11	3300	34,390
206	13	3900	45,440

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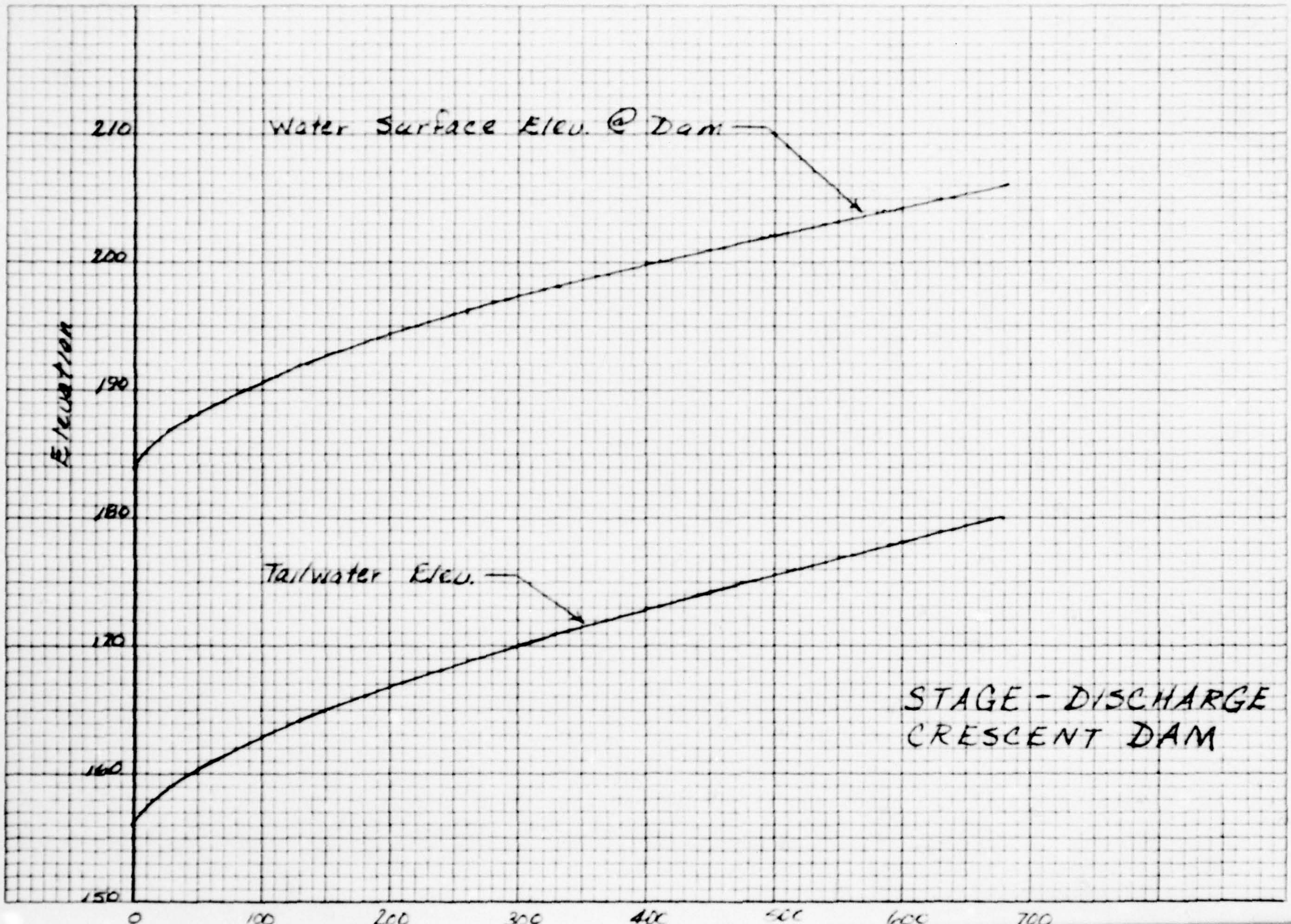
PROJECT NAME ______ DATE 8-21-79

SUBJECT Crescent Dam #2 PROJECT NO. ______

DRAWN BY JAG

Total Discharge

Elev.	H_e (ft)	Q (cfs)
184	0	—
186	2	13,870
188	4	44,100
190	6	86,270
192	8	136,850
194	10	195,640
196	12	260,290
198	14	332,280
200	16	410,870
202	18	495,570
204	20	585,980
206	22	681,800


Water Surface Elev. @ Dam
Tailwater Elev.
Elevation
210
200
190
180
170
160
150
0
100
200
300
400
500
600
700
STAGE - DISCHARGE
CRESCENT DAM

APPENDIX D

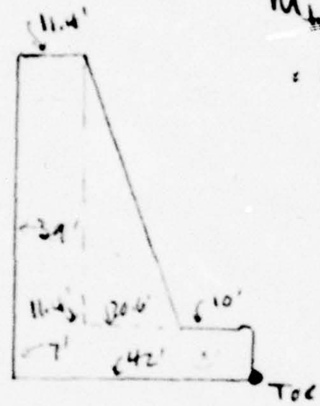
STABILITY ANALYSIS

PROJECT NAME CRESCENT DAM (DAM "A") - DATE

SUBJECT STABILITY COMPUTATIONS PROJECT NO.

OVERTURNING & SLIDING DRAWN BY

Assumed cross-section for computations



M_{toe} due to mass of dam =

$= (42' \times 7' \times .150)(\frac{42}{2}) + (\frac{1}{2} \times 20.6 \times 39 \times .15)(\frac{2 \times 20.6}{3} + 10)$

$+ (39' \times 11.4' \times .15)(20.6 + \frac{11.4}{2}) =$

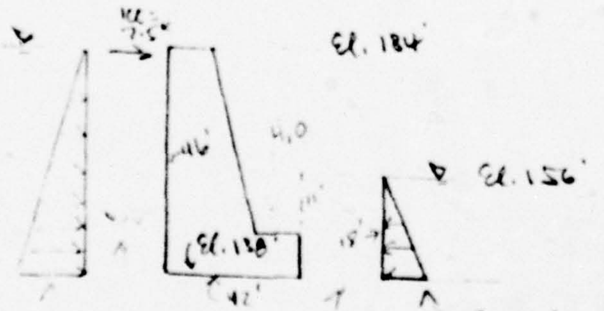
$= 926^{k} + 1430^{k} + 2420.8^{k} = 4777^{k}$

Wt. of dam =

$(42 \times 7 \times .15) + (\frac{1}{2} \times 20.6 \times 39 \times .15) + (39 \times 11.4 \times .15) =$

I. WL @ normal operating levels

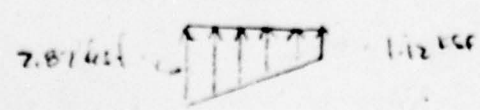
upst elev 184
dst. elev 156'



$62.4 \times 46 =$
$= 2.87 ksf$

assume upst water pressure increases as shown ground surface indeterminate (conservative)

$18 \times 62.4 =$
$= 1.12 ksf$



Moments about toe causing overturning = u.s. H_2O + uplift + ice

$$\left(2.87\times\frac{46}{2}\times\frac{46}{3}\right)+\left[\left(1.12\times42\times\frac{42}{2}\right)+(2.87-1.12)\left(\frac{42}{2}\right)\left(\frac{2}{3}\times42\right)\right]+\left(7.5^{k}\times45\right)=$$

$$=1012^{k}+988^{k}+1029^{k}+338^{k}=3366^{k}$$

Moments about toe resisting overturning = wt dam + ds H_2O =

$$=4468^{k}+\left(1.12\times\frac{18}{2}\times\frac{18}{3}\right)+\left(10\times11\times62.4\times\frac{10}{2}\right)=4872^{k}$$

<u>FS</u> against <u>overturning</u> $=\dfrac{4562^{k}}{3366^{k}}=$ <u>1.45</u> ±

Position of resultant measured from toe of dam:

$$\underline{d}=\frac{\Sigma M_{toe}}{\Sigma V}=\frac{(4872-3366)^{k}}{171+7-\left(\frac{2.87+1.12}{2}\right)(42)}=\frac{1506}{94}=\underline{16'}$$

<u>d</u> in terms of base width, b $=\frac{16}{42}(b)=0.\underline{38(b)}$

<u>FS</u> against sliding (friction-shear method, assuming 50 psi bond, $\mu=0.65$)

$$=\frac{(0.65)(54^{k})+(.05\times144\times42)+\left(1.12\times\frac{18}{2}\right)}{\left(2.87\times\frac{46}{2}\right)+(7.5)}=\frac{(61+302+10)}{(66+7.5)}=\underline{5.1}\pm$$

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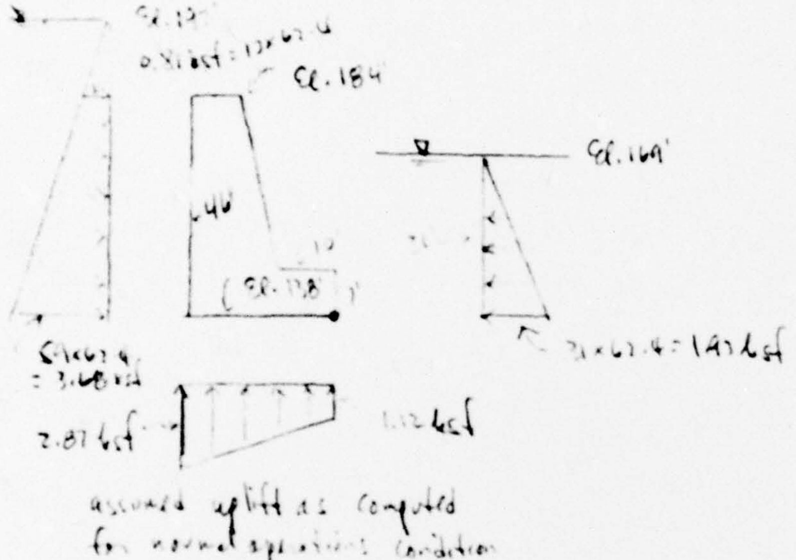
II. WL @ 1/2 PMF elevations

upst. elev 197' (13' above spil
dst. elev 169'



Moments about toe causing overturning = upst. H_2O pressure + uplift =

$$= \left[\left(0.81 \times 46 \times \frac{46}{2}\right) + (3.68 - 0.81)\left(\frac{46}{2} \times \frac{46}{3}\right) \right] + 2017^{\text{'k}} = 3886^{\text{'k}}$$

Moment about toe resisting overturning = $4777 + \left(1.93 \times \frac{31}{2} \times \frac{31}{3}\right) + (0.5)\left(10 \times 24 \times 62.4 \times \frac{10}{3}\right)$

$$= 5123^{\text{'k}}$$

neglecting wt of H_2O on ds base (ROR case)

FS against overturning $= \dfrac{5123^{\text{'k}}}{3886^{\text{'k}}} = \underline{1.32} \pm$

Position of resultant measured from toe of dam,

$$\underline{d} = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{(5123 - 3886)^{\text{'k}}}{(171 - 84) + (.5 \times 10 \times 24 \times 62.4)} = \frac{1237}{94.5^{k}} = \underline{13.0'}$$

$\underline{d}$ in terms of base width, $b = \frac{13}{42}(b) = \underline{0.31\,(b)}$

Uni A

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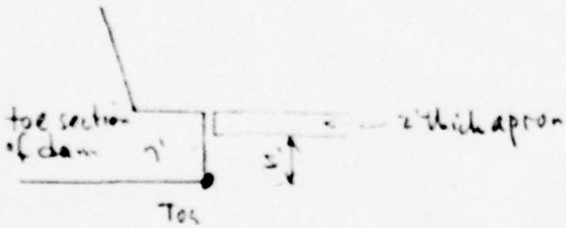
FS against sliding (friction-shear method)

$$= \frac{(0.65)(94) + (.05 \times 144 \times 42) + \left(\frac{1.93 \times 31}{2}\right)}{\frac{1}{2}(1.81 + 3.68)(46)} = \frac{61 + 302 + 30}{103} = 3.8$$

For resultant to be located at the third point of base, $d_{req'd} = 14'$.
Passive resistance by downstream apron and rock has not yet been considered but is expected to exist.

Required M_{toe} for resultant to be at 0.33(b) is $= (\Sigma V)(d)$
$= (94.5^k)(14') = 1323^{'k}$

req'd extra moment resisting overturning $= 1323^{'k} - 1237^{'k} = 86^{'k}$



(a) for $86^{'k}$ moment about toe to be provided from bond between apron and rock, bond force req'd is $= 86^{'k}/5' = 17^{+k} \rightarrow$ say 18^k

if bond is 50 psi, effective length of apron req'd would be

$$L = \frac{18^k}{(.05)(144)} = 2.5' \text{ (small, reasonable to expect}$$

also reasonable to expect similar resistance would be developed by horiz/diagonal shear in rock adjacent to toe if necessary

FS against overturning would be $= \frac{(5123 + 86)^{'k}}{3886} = \underline{1.34 \pm,\ d = 0.33(b)}$

FS against sliding would be $= \frac{61 + 302 + 30 + 18}{103} = \underline{4^+}$

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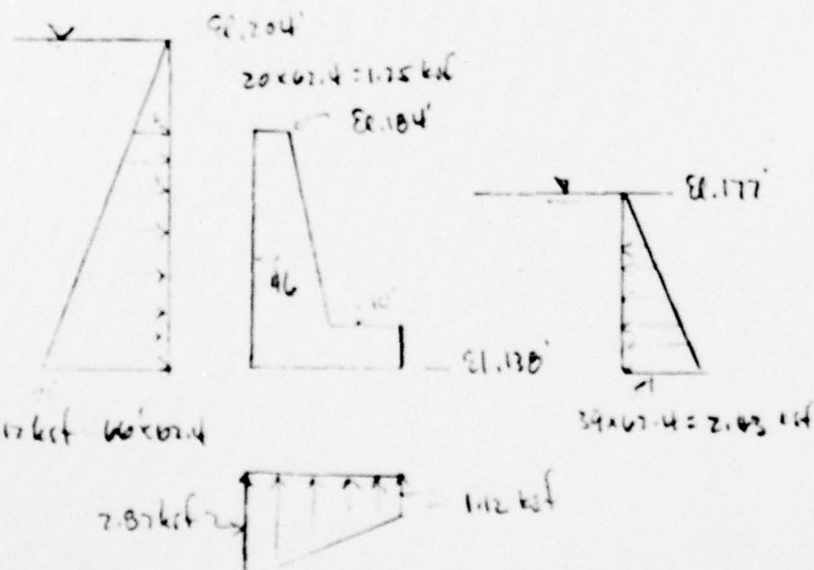
III. WL @ PMF elevation:

upstr elev 204' (20' above spi
dst. elev 177'



assumed uplift as computed for normal operations case

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Moments about toe causing overturning = from upst. H_2O + uplift

$$= \left[\left(1.25\,klf \times 46 \times \frac{46}{2}\right) + (4.12 - 1.25)\left(\frac{46}{2} \times \frac{46}{3}\right)\right] + 2017 = 4351^{\text{'k}}$$

Moments about toe resisting overturning = from wt dam + dnst. H_2O

$$= 4777 + \left(7.43 \times \frac{39}{2} \times \frac{39}{3}\right) + (0.5)\left(10 \times 32 \times 62.4 \times \frac{10}{2}\right) = 5444^{\text{'k}}$$

FS against overturning = $\frac{5444^{\text{'k}}}{4351^{\text{'k}}}$ = 1.25 ±

Position of resultant measured from toe of dam

$$d = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{(5444 - 4351)^{\text{'k}}}{171 - 84 + (.5 \times 10 \times 32 \times 62.4)} = \frac{1093}{97} = 11.3'$$

d in terms of base width, b = $\frac{11.3}{42}$ (b) = 0.27 b)

FS against sliding (friction - shear method)

$$= \frac{(0.65)(171 - 84 + 9) + (.05 \times 144 \times 42) + \left(\frac{7.43 \times 39}{2}\right)}{\left(\frac{1.25 + 4.12}{2}\right)(46)} = \frac{62 + 302 + 47}{124} = 3.3$$

5a

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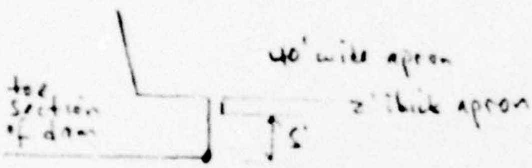
For resultant to be located at the third point of base, $d_{req} = 14'$.
Passive resistance by downstream apron and rock has not yet been considered but is expected to exist.

Required M_{toe} for resultant to be at $0.33(b)$ is $= (\Sigma V)(d)$
$= (97^k)(14') = 1358'^k$

req'd extra moment resisting overturning $= 1358 - 1093 = 265'^k$

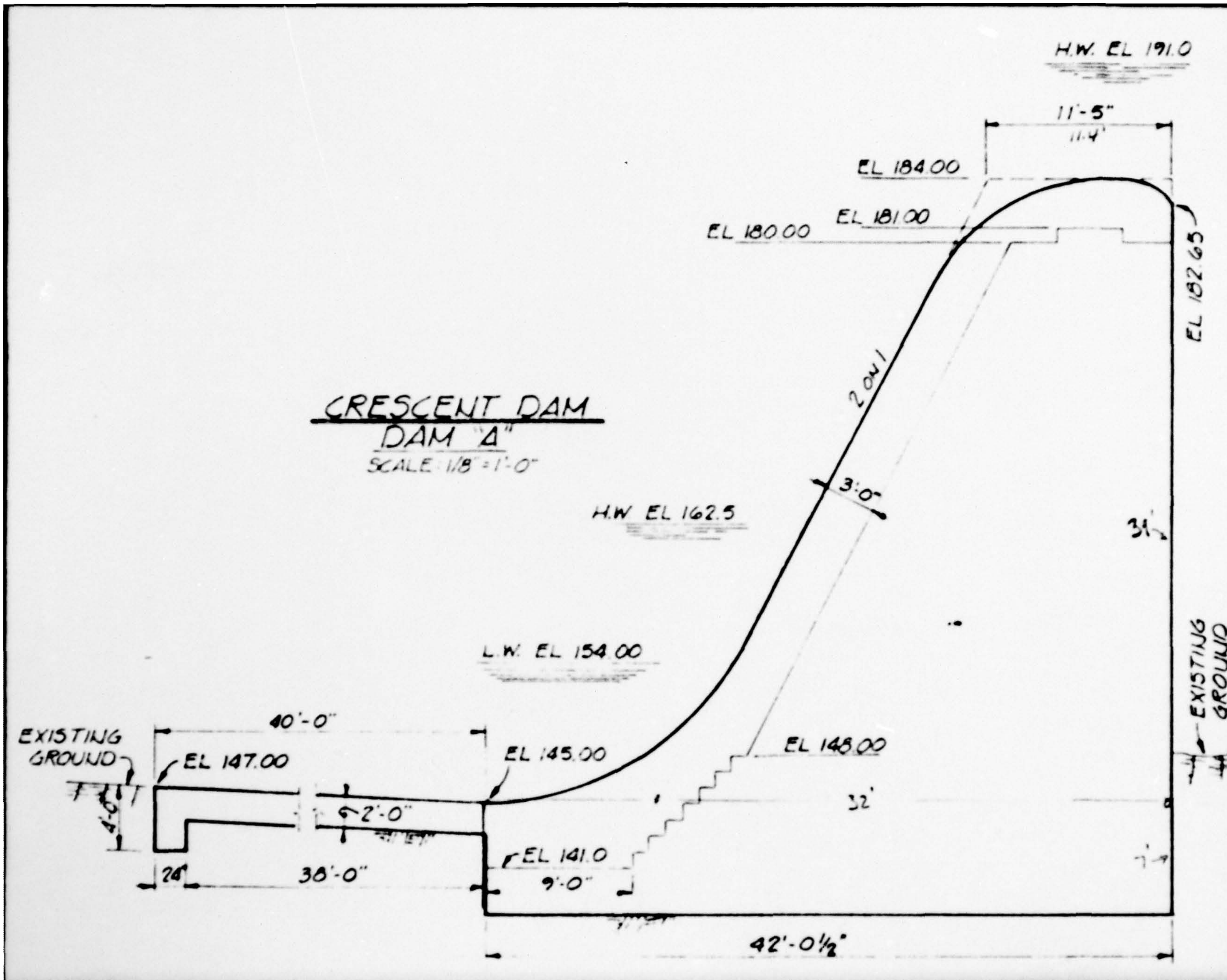


(a) for $265'^k$ moment about toe to be provided from bond between apron and rock, bond force req'd is $= 265'^k/5' = 53^k$

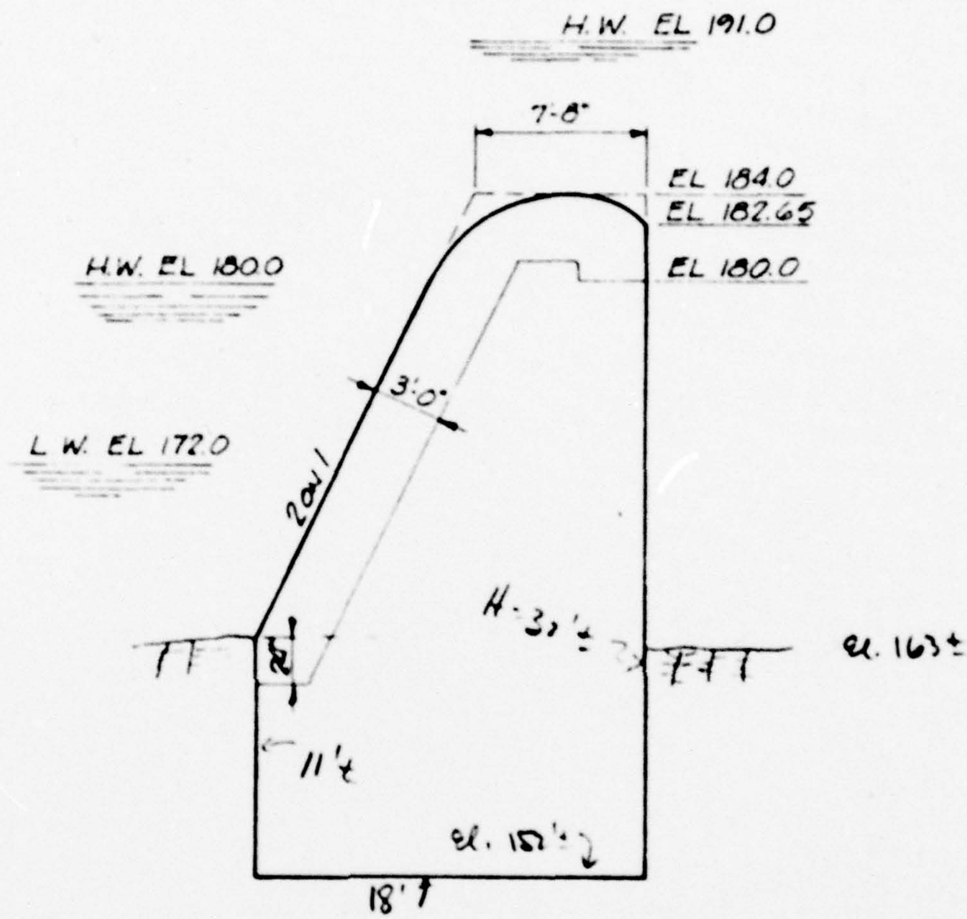
if shear is 50 psi, effective length of apron req'd would be
$L = \frac{53^k}{(.05 \times 144)} = 7.4'$ okay provided apron section does not buckle

FS against overturning would be $\frac{5444+265}{4351} = \underline{1.31+}$, $\underline{d = 0.33(b)}$

FS against sliding would be $= \frac{(413+53)^k}{124^k} = \underline{3.8+}$


CRESCENT DAM
DAM "A"
SCALE: 1/8" = 1'-0"
H.W. EL 191.0
11'-5"
11.4'
EL 184.00
EL 181.00
EL 180.00
EL 182.65
2 ON 1
3'-0"
H.W. EL 162.5
31'
L.W. EL 154.00
EXISTING GROUND
40'-0"
EL 147.00
EL 145.00
EL 148.00
2'-0"
32'
4'-0"
EL 141.0
24"
38'-0"
9'-0"
42'-0½"

184
32
15'



CRESCENT DAM

DAM "B"

SCALE: 1/8" = 1'-0"

STETSON • DALE	DATE 8-2-79	DRAWN JPG	CRESCENT DAM (DAM "B")
	JOB 2305	APP'D	

PROJECT NAME CRESCENT - DAM 2 DATE

SUBJECT PROJECT NO.

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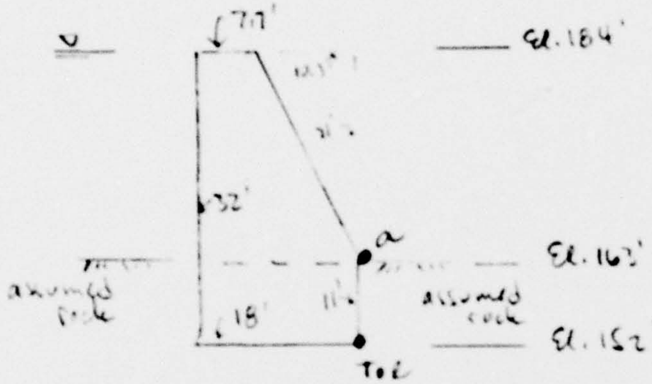
Assumed cross-section for computations



M_{toe} due to mass of dam =

$= (18 \times 32 \times .15 \times \frac{15}{2}) - (\frac{1}{2} \times 10.3 \times 21)(\frac{10.3}{3})(.15)$

Wt. dam $= (18 \times 32 \times .15) - (\frac{10.3 \times 21 \times .15}{2}) = 70$

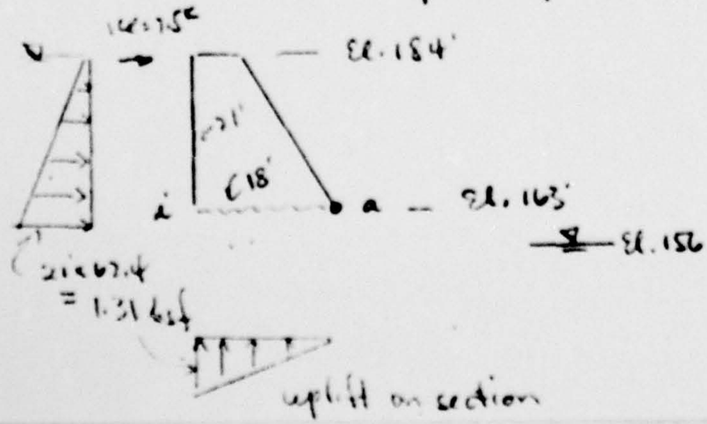
Assume shearing resistance developed in rock zones adjacent to upstream and downstream faces of dam is very great and dam cannot overturn. Analyze dam section at elevation of rock surface for resistance to overturning and sliding

M_a due to mass of dam above point a =

$= (21' \times 18' \times .15 \times \frac{18}{2}) - (\frac{10.3 \times 21}{2} \times .15 \times \frac{10.3}{3}) = 454^{k}$

Wt. dam section above point a $= (\frac{7.7 + 18}{2})(21 \times .15) = 40.5$

I. WL @ normal operating levels



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PROJECT NAME ______ DATE ______

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Moment about (a) causing overturning due to upst. H_2O + uplift + ice

$$=\left(1.31^{ksf}\times\frac{21}{2}\times\frac{21}{3}\right)+\left(1.31\times\frac{15}{2}\times\frac{2\times18}{3}\right)+\left(7.5^{k}\times20'\right)=388^{'k}$$

Moment about (a) resisting overturning = $454^{'k}$ neglecting possible tensile resistance of concrete along plane a

FS against overturning $= 454^{'k}/388^{'k} = \underline{1.17}$ (low)

Position of resultant measured from (a)

$$d=\frac{\Sigma M_a}{\Sigma V_{a\text{-}a}}=\frac{(454-388)}{(40.5)-(1.31\times\frac{15}{2})}=\frac{66^{'k}}{28.7^{k}}=\underline{2.3'}\text{ from (a)}$$

$= \underline{0.13(b)}$ (too little

since b = 18' at section analyzed, $d_{req} = 6'^{\pm}$

determine M_{reqd} for d to be at ⅓ point of base

$$M_{req}=(\Sigma V)(d)=(28.7^{k})(6')=172^{'k}$$

extra M necessary $= 172^{'k} - 66^{'k} = 106^{'k}$

estimate tensile strength reqd of concrete on plane a-a to achieve a stability condition (σ_{conc} = tensile strength in psi)

$$M_{conc}=18'\times144\frac{in^2}{ft^2}\times\sigma_{conc}\times\frac{18}{2}=106^{'k}$$

$$\text{obtain }\underline{\sigma_{conc}}=\frac{106^{'k}\times1000^{\#}/k}{18'\times144\frac{in^2}{ft^2}\times\frac{18}{2}}\doteq\underline{5}\text{ psi}$$

reasonable to expect if concrete in good condition

$\underline{FS}$ against overturning would be $= \frac{454+106}{388} = \underline{1.44}^{\pm}$

$$\underline{FS\text{ against sliding}}=\frac{(0.65)(40.5-11.8)+(.05\times144\times18)}{(1.31\times\frac{21}{2})+(7.5)}=\underline{7^{\pm}}$$

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PROJECT NAME Dam B   DATE

SUBJECT   PROJECT NO.

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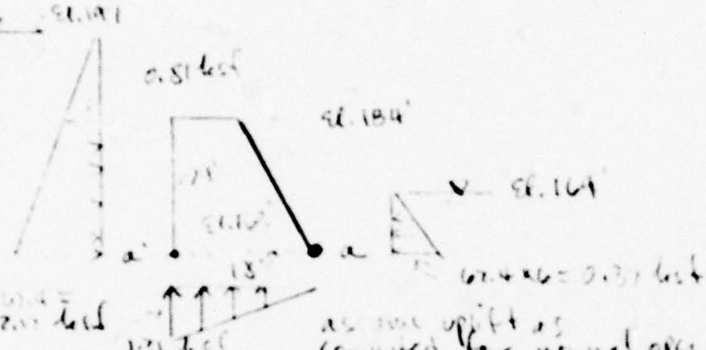
II. Case @ ½ PMF conditions   upst elev. 197' (13' above spillway)
dnst elev 161



M_a resisting overturning $= 454 + (0.37 \times \frac{6}{2} \times \frac{6}{3}) = 456^k$ neglecting possible tensile strength of concrete

M_a causing overturning $= (0.81 \times 21 \times \frac{21}{2}) + (2.12-0.81 \times \frac{21}{2} \times \frac{21}{3}) + 142 = 417^k$

FS against overturning $= \frac{456}{417} = \underline{1.1^+}$

Position of resultant, $d = \frac{\Sigma M_a}{\Sigma V} = \frac{(456-417)^k}{28.7} = 1.4$ from a $= .08(b)$ (not good)

determine M_{req} for d to be @ $\frac{1}{3}(b)$
$M_{req} = (\Sigma V)(d) = 28.7 \times 6 = 172^k$

extra M necessary $= 172 - 39 = 133^k$
estimate tensile strength required of concrete in plane a-a' to achieve a stability condition (σ_{conc} tensile strength in psi)
$M_{conc} = \frac{13^2}{6} \times 144 \times \sigma_c = 133^k \times 1000$
$\sigma = \frac{133{,}000}{\frac{13^2}{6} \times 144} \approx 6$ psi   reasonable to expect if conc in good condition

FS against overturning w/ conc $= \frac{456+133}{417} = \underline{1.41^{\pm}}$ $d = 0.33(b)$

FS against sliding $= \frac{(0.65)(28.7) + (.03 \times 144 \times 13) + (0.37 \times \frac{6}{2})}{\frac{1}{2}(0.81+2.12)(21)} = \underline{4.8^{\pm}}$

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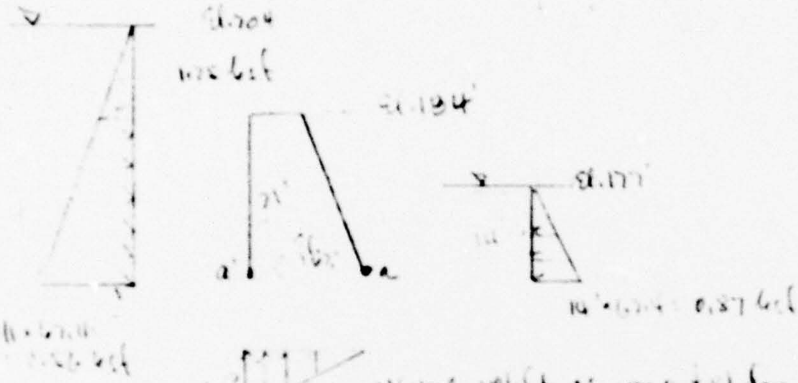
III. WL @ PMF elevations: upst. elev 204' (20' above spillway)
dnst. elev 177'



assume uplift as computed for normal operating condition

M_a resisting ovt $= 454 + (0.87 \times \frac{14}{2} \times \frac{14}{3}) = 482^k$

M_a causing overturning $= (1.25 \times 21 \times \frac{21}{2}) + (\ldots \times 21 \times \frac{21}{2} \times \frac{21}{3}) + 142 = 514^k$

FS against ovt $= 482/514 = 0.94$

determine M_{req} for d to be @ $\frac{1}{3}$b
$M_{req} = \Sigma V \times d = 28.7 \times 6 = 172^k$

extra M necessary $= 172 - 482 + 514 = 204^k$

estimate tensile strength required of conc on plane a-a' to achieve a stability condition (f_{tc} = tensile strength, psi)

$M_{conc} = \frac{18^2}{6} \times 144 \times f_{conc} = 204^k \times 1000^{\#/k}$
$\therefore f_{conc} = \frac{204{,}000}{7776} \cong 1$ psi possible if conc in good condition

FS against overturning would be $= \frac{482+204}{514} = 1.33 \pm$ $d = 0.33(b)$

FS against sliding $= \frac{(0.65)(28.7) + (.075 \times 144 \times 18) + (.87 \times \frac{14}{2})}{\frac{1}{2}(1.25 + 2.56)(21)} \cong 4$

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PROJECT NAME Crescent Dam I DATE

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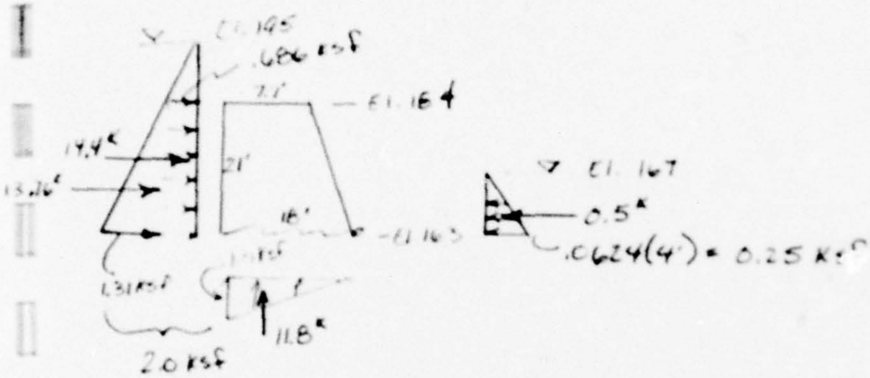
[illegible] ½ F?? [illegible]s - from USGS Flows

Dam wt. = 40.48^k



$M_{Dam} = \frac{1}{2}(21')(10.3')(.15\,ksf)(\frac{2}{3} \times 10.3') + (21')(7.7')(.15\,ksf)(10.3' + \frac{7.7'}{2}) = 454.7^{1\text{-}k}$

16.22^k 24.26^k

$M_{dnstrm} = 0.5^k(4/3) = 0.67^{1\text{-}k}$

$M_{upstrm} = 14.4^k(10.5') + 13.76^k(21/3) = 151 + 96 = 248^{1\text{-}k}$

$M_{up\,lift} = 11.8^k(\frac{2}{3} \times 18') = 141.6^{1\text{-}k}$

$M_{overturn} = 389^{1\text{-}k}$

$F.S._{overturn} = \dfrac{455^{1\text{-}k}}{389^{1\text{-}k}} = 1.17$

Position of resultant $= \dfrac{\Sigma M}{\Sigma V} = \dfrac{455 - 389}{40.48 - 11.8} = 2.3' = 0.13\,b$ outside middle third

APPENDIX E

REFERENCES

APPENDIX

REFERENCES

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